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MANUALS OF THE HISTORY OF ART

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Mediaeval and Modern Oriental

By

François Benoit

Professor of History of Art at University of Lille

Illustrated by 145 Engravings, 87 Maps and 819 Diagrams

Paris

1913

Translated by R. Clifford Ricker D. Arch.

Professor of Architecture

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Introduction.

The arrangement of a history of mediaeval and modern architecture [illegible] by stylistic tendencies.

It [illegible] commence with the East, and the extreme East. [illegible] not before the beginning of the second thousand years from the Christian era in the West did the art of building acquire a limited knowledge. At that date in the West, in the South and the East of Asia, in the basin of the eastern Mediterranean; finally in the vast area of Mohammedan civilizations had already been multiplied the brilliant proofs of a robust and fertile maturity(Fig. 1).

There should be connected with the East the activity displayed during the middle ages by the countries around the eastern Mediterranean, that in antiquity the triumphant course of Hellas had subjected to the supremacy of Egean genius. [1] For if Byzantine production proves that the force of the latter was surely weakened, it no less attests that its impulse was then diverted by an energetic expansion of Asia.

Note 1. See Volume I of this work, devoted to antique architecture.

Finally, it is proper to not attempt the mediaeval West only after having pursued -- as suited to the case until the end of their careers or until our own epoch -- the different schools of the East and the Extreme East. Their presentation in a group -- as they occurred, within the scope of the second volume of this work -- corresponds to the twofold fact, that they are allied by some common tendencies, and that all were in various degrees, directly or indirectly, influenced by radiation from one or more centres of art, formed in the Mesopotamian-Persian region by the Chaldean, Assyrian, Achemenide, Hellenistic, Sassanian and Mohammedan civilizations.

The examination of the material of this Volume forms a logical progression in six stages.

The first division of our plan rightly belongs to Mesopotamian-Persian architecture in the Parthian and Sassanian epoche.

A second Book will be devoted to the Christian architecture of the mediaeval East, which follows from the preceding in a certain measure.

We shall successively examine:--

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Part first, the principal Christian architectural styles of western Asia and of north Africa -- those of upper Mesopotamia, Syria, Asia Minor outside of the Egean, and of Armenia, which afford evidence of invention.

Part second, the secondary Christian architectural styles of western Asia and of north Africa -- those of Mohammedan Arabia, Coptic Egypt and North Africa, whose initiative was less and dependence was multiplied.

Part third, Byzantine architecture, the representative of the third epoch of Egean architecture, and which combined with the Egean spirit the borrowed elements, some actually Hellenistic-Roman, others from Syria and from Christian Asia Minor, with the last from Mesopotamia and from Persia.

In Book third, we shall study the eclectic architecture of Mohammedan civilizations, that owes more or less to most of the preceding.

A fourth Book will collect the eclectic architectural styles of eastern Europe, delayed and under obligation to the older Byzantine, Armenian and Mohammedan; on the one hand, of Russia, on the other, those of Servia and of Moldo-Wallachia.

In a fifth Book will be grouped architectural styles, which betray influences from Mesopotamia, Persia and Greece, but manifest a profound originality; these are the architectural styles of southern, central and eastern Asia.

We shall further examine in:--

Part first, the architectural styles of Brahmin and Buddhist India and of China, that demand this in threefold regard to a age, duration, extension and radiation.

Part second, the architectural styles of upper Asia, that depend on India and China; those of Indo-China and of Indonesia, satellites of India; lastly, that of Japan, which proceeds from the Chinese.

The materials for Book sixth is presented by the indigenous architectural styles of America, Oceanica and Africa.

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VOLUME II. ORIENTAL.

Book I. Architecture in Mesopotamia and Persia in the Parthian and Sassanian epochs.

Chapter 1. Requirements. -- Monumental Chronology and Topography.

From the beginning of the 4 th century B.C. to the beginning of the second third of the 7 th century A.D., the country of Mesopotamia and Persia was the scene of an intense industrial and commercial activity, of an ostentatious civilization and of a grand political flight, manifested in the brilliant fortunes of the empires of the Seleucids (306-130), Parthians (130 B.C.-226 A.D.) and Persian - Sassanian (227-641).

Our knowledge of the artistic production under the Seleucids is very little. We only know, that under the government of t these princes, the energy of the Hellenic conquerors inspired a civilization, which had been slightly depressed under the last Achemenides; that the country of the Tigris and the Euphrates was alive and prosperous, in a state to pay the cost of dazzling luxury and Magnificent princely and aristocratic pomp.[1]

Note 1. Seleucia, capital of the empire, was founded in 306 B.C., sacked by Romans in 116 and in 165 A.D., destroyed by t them in 198, having even 600,000 inhabitants.

The dynasty of the Arsacides included warlike, powerful and rich princes, ready to erect military and secular, useful and luxurious structures. But our evidence is rare and of little significance, composed of the vestiges of a Temple at Kingawar[2] of the remains of palaces at Assour and Susa; of funerary monuments at Warka; and particularly of the ruins of Hadr (Hatra), which was a strong and wealthy city during the two first centuries A.D.[1]

Note 2. On the route from Bagdad to Hamadan.

Note 1. Hatra, that Sapor I destroyed in the middle of the 3 rd century, owed its prosperity to its position at the point where the route from the Persian gulf branches toward Persia on the one hand, and toward Asia Minor on the other.

The small amount of information possessed by us concerning the architectural work of Mesopotamia and Persia under the government of the Sassanides, reveals that it was considerable and important in certain respects, particularly under princes

like Chapour (Sapor) I (240-271), conqueror of the Romans; Vaharam V Gaur (418-438), whose reign was beneficial; Chosroes Anouchirvan (531-579), an excellent sovereign, victorious, wise and refined; Chosroes II Purviz (591-628), who dominated A Asia from the Indus to the Mediterranean and from Arabia to t the Black Sea, architecture benefited from the fortunes of sovereigns, exalted and enriched by fortunate wars, by a great n national and religious enthusiasm,[2] and finally by unusual prosperity. Its career ended at the same time as that of the S Sassanian empire, destroyed by the expansion of Islam (641).

Note 2. The Sassanides claimed descent from Ahuramazda and posed as champions of his religion.

The evidence -- at least in the present state of science -- is confined to a strip of territory extending between the plateau of Iran on the one hand, and on the other being the Tigris south of Mossoul, and the Persian gulf. The structures form four groups:-- one located in the south in Fars; another in Susiana; the third in the north of Lauristan; the last being in the region of Bagdad.

As much as in the Achemenide epoch and for the same reasons[3] there is a lack of religious and funerary monuments. On the contrary, there exist very considerable remains of domestic e edifices and of works of public utility.

Note 3. See Volume I, page 394.

3 In Fars is known the Palace of Sarvistan on the route from Shiraz to Bender Abad, and that of Firouz Abad on the route from Sarvistan to the Persian gulf.[1]

Note 1. By reason of the authority, that without speaking of the particular competency of M. Marcel Dieulafoy, his opinion derives from the fact of having resulted from the examination of the ruins themselves, it is proper to note, that the learned author of the Art Antique de la Perse estimates the c construction of the Palace of Firouz Abad as preceding the Parthian epoch, and even the Macedonian conquest. He likewise h has in press a special study of this very important question.

We take the opportunity to make a correction in the Note placed at the bottom of page 388 of Volume I of our work. An error caused a mistake in attributing to M. Dieulafoy the placing of the erection of the Palace of Sarvistan in the Achemenide

epoch, even when he believes that it may be dated from the 4 th or 5 th century A.D.

In Susiana the dykes of Karoun, the piers of the Bridges of Dizfoul and Chouster, date from the reign of Chapour I; on the banks of the Kerka exists a fortion of a Palace, the Tag Eivan.

In the north are to be seen:-- near Zohab on the route from Kermanshah to Bagdad, at a place called Kasr-e-Chorsov,[2] two palaces of Chosroes II Purviz, one large (AmasatAi-Chosrov), and one small (Kal'a-i-Chouar Kapi), protected by a fort (Kal'a-i-Chosrov); a little north of the last place being a palace, contemporary with those just mentioned, that the natives call Haouch-Kouri; on the same route and near the pass of Zagros is a Sassanian triumphal monument, the Takht-i-Ghirra, and another near Kermanshah, the Takht-i-Bostan; in the valley of Sein Merre are numerous remains of cities, -- notably at Chirvan a and particularly at Derre-i-Chahr, which was Badaka, and a palace at Kal'a-i-Hazar-dar. Finally and especially in a bend of the Tigris on the site of Ctesiphon -- a twin city of Seleucia -- which was the capital of the Sassanides and one of the wonderful cities of the East, celebrated for its gardens, its wealth and the splendor of its palaces, still stands a part of the residence of Chosroes I Anouchirvan, the grand Tag-e-Kesra[3]

Note 2. Chirin was the name of the wife of Chosroes II.

Note 3. Ctesiphon was founded a little after Seleucia, grew opposite it, and survived the ruin of its elder sister, completed by the Romans at the end of the 2 nd century.

Chapter 2. Conditions. -- Influences. -- Radiation.

We have defined in Volume I of this history the conditions provided by nature for the architects of the Parthian and Sassanian epochs. [4] On those of the human and technical order, we lack information. Yet it is certain, that the sovereigns disposed of the same facilities for the supply of costly materials and of labor, as their predecessors at Babylon, Nineveh, a and the Achemenides. [1] On the other hand, the quality of the s systems of covering applied by Parthian and Sassanian constructors, the taste of these for harmonious effects obtained by calculation and by geometrical constructions, [2] assume an intellectual domain, a faculty of invention and a pretty high s scientific culture.

Note 4. Volume I, pages 117, 392.

Note 1. Volume I, pages 118, 119, 392.

Note 2. See page 19 in this volume.

In a general way may be distinguished two schools; a Mesopotamian, commended by Hatra and Ctesiphon, and a Persian, honored by the edifices of Fars, Susiana and Lauristan.

In Parthian architecture and still more in the Sassanian may be recognized shoots from the ancient Mesopotamian trunk with a Persian graft. Their development was doubtless influenced by foreign arts. Parthian decoration borrowed most of its motives from Hellenic art in a more or less denatured form, which was presented to it by the Grecized colonies of Seleucia a and of the Bactrian cities. The Sassanian school did likewise, although in very restricted measure, and it had some obligations to Byzantine art.

On the other hand, the extension of the Seleucid empire and of those succeeding it in some localities, even to the Mediterranean, the confines of Egypt, the Persian gulf and far into central Asia, first made of Seleucia, and then of Ctesiphon a world marketplace, an exchange of ideas, where were crossed t the original currents of eastern Asia as well as of Egean Regions.

Yet the Mesopotamian-Persian styles, whose activity was displayed after Alexander's expedition, particularly those of the Sassanian epoch, were alive and innovating. Since the native peoples were remarkable gifted and were sustained by the trad-

traditions of more than two thousand years, the various artistic importations acted as ferments and reagents, determining a new career of national genius and a fertile boiling up of inventions.[1]

Note 1. From the lack of the manner and procedure of these inventions, which will be known only after the excavation of the ruins of Seleucia and of the cities, which flourished in upper Mesopotamia, their reality and their nature are revealed to us by the Parthian and Sassanian monuments of Mesopotamia, of Persia, and of western Asia derived from them.

We have already indicated the universal radiation of these schools. Let us recall that it affected central, southern and eastern Asia as well as western Asia and Mediterranean Europe; the art of China as well as that of India; Hellenistic and Roman architecture as well as Christian and Mohammedan, in Syria, Asia Minor, Armenia, Egypt and the Egean region.[2]

Note 2. See the Introduction.

Chapter 3. Programmes and their Realizations.

Conditioned by the climate and by the customs of the East, the preparation of a programme for a Persian or Sassanian palace tended to protect the residence from the excess of heat and light, as well as against curiosity and human enterprises; also to isolate both places for stately life, for private existence, for storage of provisions, lodgings for servants and f for domestic animals.

The facades were solid, air and light only being received f from the courts. An energetic ventilation was furnished by m means of fireplaces and by pottery tubes passing through the vaults (10,5). In the burning regions of Mesopotamia and of Susiana, the elevation comprised for the hot season a ground story with vaulted halls without windows, and for the cool hours a largely open story, accessible by stairways or by inclined corridors (5).

An imperial or princely seraglio (6) had as its essential part a divan, suited for audiences and state purposes, otherwise called a great hall, equivalent to the "apadana" of Achemenide Persia [1] and the "talar" of modern Persia. [2] In Mesopotamia, this war designed at a grand scale [3] as a rectangular interior, deep and lofty, opening upon a vast court; doubtless it could be closed by porticos (6,1;5; 8) [4] In Persia a square hall was accessible through a great vestibule, extending almost as high as the facade and open for its entire height, sometimes in communication with lateral antechambers, [5] or again preceded by a columnar portico. [6] (5,52,3,6).

Note 1. See Volume I, page 394.

Note 2. See page 212, later.

Note 3. At Ctesiphon the useful area of the throne hall is a little more than 13,400 sq. ft. (158 × 85 ft.). At Hatra, the sides are 98 and 48.5 ft.

Note 4. Note the persistence of this room opening on a court in the Persian programme of the mosque; also page 215).

Note 5. See the Palace of Firouz-Abad; the Kal'a-i-tchaouar Kapi at Kasr-e-Chirin.

Note 6. See the great Palace of Kasr-E-Chirin.

Isolated from the state apartments and provided with proper passages, the harem comprised large halls well protected from

heat, and chambers sometimes rather small, around one or more courts (6,3; 3,6; 6).

A programme of a Parthian or Sassanian palace normally comprised a great extent of gardens, with large areas of water and a park enclosed by walls.

The enclosure of Hatra, the fort of Kasr-e-Chirin, indicates that a Parthian-Sassanian fortification comprised behind a wide moat, walls sometimes doubled and flanked by round or square towers.(7).

In what concerns the public works, the science of Sassanian engineers is attested by the quality of their hydraulic undertakings, and particularly by the solidity of their bridges, w which have resisted till our time the formidable attacks of t the torrents spanned by them; that of Chouster measures no less than 1690 ft. and counts 41 arches (13).

The Takht-i-Bostan and the Takht-i-Ghirra authorize the hypothesis, that Sassanian freely realized a memorial monument in the form of an open chapel with one or more aisles.

As for the Parthian temple, the vestiges of that of Kingawar reveal that its programme isolated the sanctuary in the middle of a great rectangular court surrounded by porticos.[1]

Note 1. Compare the taste of the Hellenic architecture of Asia Minor for this arrangement. Volume I. Page 280.

Chapter 4. Construction.

Parthian and Sassanian architecture were very expert in the art of building; particularly the second, to which it is doubtless necessary to give the honor of the first practical solution of the covering of a square interior by a calotte with a circular base.

I. Materials.

The favorite material of the Parthian and Sassanian masons was clay, moulded in squares measuring on the average one ft. (11.8 ins.) on each side and 3.2 ins. thick, which were employed crude or burned, according to the loads imposed on the structure.

In the ancient Assyrian country, rich in limestone -- witness the ruins of Hatra -- stone was used as cut stone and rubble. Likewise in the mountainous regions bordering Iran, where in the lack of clay, were used boulders, abundantly contained in the alluvium of the valleys; they were sometimes employed rough; sometimes by cutting in slab form, a shape was given to them analagous to that of bricks (9,1,2; 10,1). On some occasions -- witness the Palace of Sarvistan -- stone and burned b bricks were associated in the same edifice; the first served for the walls and the second for the vaults.

Lime was in common use, and it entered into the composition or a remarkable mortar. Particularly in Persia, enormous use was made of gypsum, both for the joining of rubble and for making stucco coatings, as well as for casting ornaments (9,1,2,6).

In a general way, the use of wood was reduced as much as possible; in many regions it was exceptional. On the contrary, metals were lavished for ornamental purposes.

II. Procedures.

Wall and Portico.

In Mesopotamia, construction was conscientious and intelligent. The facings in cut stone for walls were set dry with care and success, the nucleus being economically constructed of a mass of rubble. [1] The facades of the Palace of Hatra reveal, that it practised the reenforcement of walls by the aid of buttresses, and the facade of the Palace of Cteriphon attests, t that it understood how to ensure the stability of a panel of masonry by the threefold expedients of an elevation with reces-

recesses, a framework of buttresses and arcades, and finally an internal bonding by courses of beams.(9,3,4,5; 8).[2]

Note 1. See the ruins of Hatra.

Note 2. At Ctesiphon the bonding was formed by beams with ends connected by keyed splices and iron bands. They were placed in spaces carefully constructed and ventilated.

12 In the entire extent of the area of Parthian and Sassanian architecture, a mass of rubble was connected by gypsum or lime mortar.(9,1,2). Sometimes this procedure was applied to cut stone.[1]

Note 1. See the piers of the Bridge of Chouster.

They understood how to realize the shaft of an isolated support by an artifice familiar to primitive Chaldea,[2] that of a pile of bricks partly recut, which was covered by a coating of gypsum.(9,6).

Note 2. See Volume I, page 185.

For an opening, although the method of the relieved lintel was practised,[3] it was usually spanned by a voussoir arch, semicircular when the span was small, sometimes pointed in case of a wide opening; more frequently an elliptical curve, which will be more accurately defined later.(Page 20). The imposts were carried as high as possible.(8; 9,1,2,4; 10; 11).

Note 3. See Hatra.

On account of the lack of wood, Sassanian constructors made shaft and succeeded in reducing to a minimum the preliminary carpentry. First they acquired the ability to suppress the greater portion by arranging to erect the arch arcade behind the support, in order to secure a place for resting the ends of t the centering; after completing the construction, a covering of gypsum concealed the expedient.(9,1,2). A second artifice permitted the use of light forms; an arrangement of voussoirs with corbelled courses approaching their position diminished their clear span considerably.(9,1,2; 10,1).

The Covering.

Still, in the covering triumphed Parthian and especially Sassanian construction. It was realized in the form of vaults, tunnel or combined in calottes. The first system was the rule in Mesopotamia, where a masterly application of it was made.[5]

Note 5. The spans of the great tunnel vaults of the Palace

measure 48.6 ft.; those of the great hall of Ctesiphon have t the corresponding dimension of 88 ft.!

The erection of Parthian and Sassanian coverings was strictly conditioned by the scarcity of wood, which excluded the construction on centering. Doubtless there are examples of tunnel vaults built on forms; [1] but normally in the clear space w were fashioned shells, like those of the great nave of the Palace of Firouz-Abad and of the hall of Ctesiphon, whose clear spans repeatedly measure 40.4 and 85.0 ft. The method was the same as in Mesopotamian and Egyptian antiquity; [2] that by slices, starting from a head wall or an initial arch built on centering. A series of jointed arches were built, each formed of a row of tiles set endwise and connected to the preceding arch (10,8). The operation was facicilated by the energy and rapidity of the setting of an ekcellent mortar and also by three a artifices; the first reduced the number of unsupported voussoirs by carrying the horizontal courses ar high as possible (10, 2,8); the second favored the adhesion of the tiles to the preceding arch by inclining the slices backward; the last diminished the clear span by imposing on the vault a stilted profile.

Note 1. See the cut stone vaults of the Palace of Hatra and those of the side aisles of the Palace of Firouz-Abad.

Note 2. See Volume I, pages 71, 137, 138.

Sassanian tunnel vaults were strengthened by a division of their mass into several superposed shells, independent and of different construction; for example, that of Ctesiphon comprises no less than ten, the first four from the intrados being constructed in slices, and the others with radial joints.(1,2).

Against the risks of overthrowing the walls by the side thrust of a tunnel vault, various precautions were taken; localizing the springings on the internal faces of the walls, so that the exterior formed a projection (10,5); abutting the lateral tunnel vaults constructed perpendicular to the principal one (6,1); consolidation by internal buttresses, whose forms were sometimes very ingenious; such as those of the gallery of the Palace of Sarvistan, uhich united the arches and reduced the span by an arch in them near the ground (10,9).

Yet, it is particularly in the cowering by domes, that is manifested the constructive genius of Sassanian architects.[1]

We have mentioned in its time (Volume I, page 186) the knowledge of the system possessed by Mesopotamian architecture. But graphical documents indicate, that it was only applied at a s small scale.

Note 1. Recall that at Firouz-Abad the calottes are of rubble like the walls; while at Sarvistan, they are of brick, the walls being of rubble (10,6).

Sassanian domes are of great dimensions, [3] on the contrary, and reveal a very skilful solution of the problems set by that kind of vault. The thrust for the clear span was reduced by the choice of an elliptical profile, analagous to that of the tunnel vaults (10,5). The resulting difficulty from the discord of the supporting square wall from a shell of circular p perimeter, and a square enclosure, was overcome by the aid of two expedients; first by means of an "angle trumper,", i.e., by an arch thrown across the opening at each angle and closing at the same level as the walls, determining an octagon; then by the aid of "pendentives", i.e., of concave triangles of masonry in the form of spherical triangles between the trumpets and the supporting walls, they succeeded in ensuring to the c calotte a continuous support (10,6).

Note 3. Those of the Palace of Firouz-Abad have a clear span of 45.9 ft. and extend to 75.5 ft. above the ground.

The procedure revealed by the halls in stories of the Palace of Hatra (10,8), and particularly the gallery of the Palace of Tag-Eivan (10,4) is no less indicative of the ingenuity of Parthian and Sassanian architects. Indeed, by means of partitions raised on arches, the upper part of a hall is divided in compartments, whose covering is realized, either by a ceiling of s slabs -- that is the solution shown by the ruins of Hatra -- or by tunnel vaults, as at Tag-Eivan. Besides the advantage of subdividing the difficulty of covering a great interior, it again offers that of a localization of the loads and thrusts at a small number of points, which permits a better realization of the resistances and the piercing of wide openings in the intervals. [1]

Note 1. The expedient was known to Roman architecture and familiar to that of central Syria (page 54), also Volume I, pages 486, 487, 493). That applied at Tag-Eivan is likewise to be

observed in the Romanesque Church of S. Philibert at Tournus. (Volume III). Besides, its threefold principle -- distinction between a skeleton of arches and the compartments; concentration and resistance of the destrictive forces produced by the vault -- is eminently characteristic of the Gothic system. (Volume III). Was there an education of the West by the East, or merely a fortuitous meeting of two independent attempts? The first hypothesis is no less than improbable.(See M. Dieulafoy's Work).

17 Chapter 5. Effect.

Sassanian or Parthian, this wise architecture was al elegant as its iental sisters, and like them was more preoccupied with the internal a earance than that of the exterior; loving better the effect of ornamen tion than that of relief.

Effects of Picturesque Order.

The vastness of its halls and its enormous porticos indicate a desir to astonish by the manifestations of material grandeur, and one cannot deny to the conuments of Hatra, Kasr-e-Chirin, and particularly of Cte iphon, the possession in an eminent degree, of the picturesque quality the grandiose tone. What is more striking than the opening on the gre facade, illuminated by the sun of the East, the opening filled with sh ow, of an arch nearly 88.5 ft. wide and 106 ft. high? (8).

Effects of Relief.

Although construction in bricks or rubble scarcely favored this, Par ian and Sassanian arts sought the effect of secondary monumental relie moreover in the Mesopotamian tradition of simple substructures (Volume page 142), crenelated cornices, and the animation of facades by pilast or half columns. The ruins of Hatra exhibit a Hellenizing arrangement bands, friezes, cornices and of spaced pilasters (3; 12,1,6); those of Firouz-Abad a scheme of high and recessed arcades and of engaged colum rising to the upper cornice (12,8); the facade of Ctesiphon, a more di ersified composition, which develops in height three stories defined b wide bands and each subdivided in two, with in a horizontal direction nels separated by half columns and enhanced by arcades.(8; 9,3; 12,7).

The ordinary materials of Parthian and Sassanian were not favorable obtaining effects by the relief of the details.

The usual shape of the isolated support was that of a cylinder surmo ted by a slab. A luxurious programme comprised for a column the compl tion of a capital and a base; for pilasters and piers, that of an impo cap. The forms of the capital were frequently in the barbarized image of Hellenic types (3; 14,2,4,6); but Sassanian art also realized the s uctural form of a truncated pyramid, relieved by sculptures on its fac (14,1,3).[1]

Note 1. See on page 171 an analogous form of the Byzantine capital.

The mouldings were simple, essentially composed of angular projectio by a hollow, a quarter round, or a great torus. (12,1-6).

Effects of the Harmonic Order.

One of the most characteristic traits of Sassanian architecture is i

taste for effects of the harmonic order, resulting from putting the edifices in proportion by means of calculations, and particularly by geometrical constructions.[2]

Note 2. I. On O B (half span of the room) is constructed an Egyptian right-angled triangle O B A. With B D (= 2 O B) as radius, D C is described; then with A C (= O A), the arc C F E. The ratio of O F (= 2 O A) to B D (= 2 O B) is that of 3 to 4, like that of O A to O B.

II. The module is an Egyptian triangle constructed on A B (half clear span of an arch). The width of the hall (D E) = A B + B C. The height of the columns (F B) = A C; the height from the ground to the gallery (I P) = 2 F A + 3 B C. The diameter of the dome (M N) = H I = 2 A B + B C. The height of the springings of the trumpets above the gallery (R P) = A C. The rise of the trumpets (N R) = 2 A B. The ratio of the height of the dome to its diameter is that of 3 to 4, the same as that of A C to A B.

III. The module is an Egyptian triangle constructed on A B (half span of one of the arches before the walls). The height of the piers (E B) = B C; the width of the pier (E F) = B C; the height of the vertical surfaces (F H) = 2 A B + B C; the height above the ground of the springings of the vaults (F M) = K F = 2 A B + 2 B C; the rise of the trumpets (H M) = E F = B C. The profile of the arches and vaults realizes the ratio of 3 to 4, that of A C to A B. (From M. Dieulafoy's Art Antique de la Perse).

Thus the curve determining the arches and vaults is an oval with three centres, each radius having its length, the position of its pivot, and the magnitude of its displacement determined by an "Egyptian" triangle, otherwise stated, by a right-angled triangle, whose sides are to each other as the numbers 3, 4 and 5 (15,1).

On the properties of this figure were further based a shythmic formula, that guided the composition for the whole as well as for the details. Finally, all the dimensions were related to a unit of measure, a module. (See Volume I, pages 71, 75).

Effects of Ornamentation.

Parthian and Sassanian architecture were lavish with ornamentation, particularly of all that derived its effect from color.

To mask the unpleasing appearance of the bricks or rubble, they sometimes had recourse to a facing of cut stone [1]; commonly to coatings of lime mortar and especially of gypsum, to panelings of terra cottal to hangings of fabrics, richly ornamented and in many colors, even to owerlays of silvered or gilded copper, and incrustations of precious stones. A great part was taken by ornamental and significant frescos. Some ancient texts arouse ideas of prodigious splendor. [2]

Note 1. See the ruins of Hatra (3).

Note 2. In regard to a Parthian palace, Philostratos writes:- "It was covered with places of copper, that reflected the rays of the sun. - - - Porticos were decorated like paintings, with fabrics embroidered with gold, framed by shining plates of silver and with plates of gold - - a hall was covered by a dome, internally faced with sapphires, shining with celestial brilliancy; on the blue ground of the stones were raised in gold t the images of gods".

As for the metallic overlays, the evidence of Philostratos is confirmed by numerous traces of fastenings observed on the walls of Hatra and of Ctesiphon.

Although essentially polychromatic, the ornamentation was also in large measure in relief, and it was further frequently realized by the economical method of coatings of gypsum. Sculpture failed in execution, which if the scale were small, presented the minuteness and dryness of goldsmith's work [1] (17), and in the case of large proportions, it was soft and heavy. In a general way, it preferred to the effect of relief that of a flat relief and of forms inliad by sinking.(1411,3; 17; 65).

Note 1. Sassanian goldsmith's work possessed remarkable skill, and its products were in demand in the extreme East as w well as in the extreme West.

Painted or sculptured, Parthian and Sassanian decoration abused details and pleased itself with monotonous, current or cowering compositions, scattered, in bands and as arabesques; indeed it was modeled on those of fabrics and of jewelry (14,1; 17; 18).

Besides a certain number of Hellenistic types -- acanthus, eggs (Hatra), more or less transformed, and Achemenide formulas, its repertoire notably comprised the tall hollow with sev-

several rows of flutes [3], a certain quantity of plant and animal forms changed by extreme conventionalization and by a mode of conventional presentation with regular and symmetrical arrangements (14,1; 16; 17; 18). Some possessed a symbolic value; vine branches (16), pineapple, tree of life, birsd or animals facing each other on opposite sides of the latter, or of a vase, a sign of the soucce of vitality. The image of man was n not excluded; the Parthian school took pleasure in animating the surface of a wall or of an archivolt by heads with a barbaric but powerful effect (8); the Sassanian loved allegorical personages. [1] But what it especially favored, and which form one of its characteristic traits, were fanciful figures with monstrous and strained forms with grimacing expressions, already dear to Parthian art.[2] Finally it adored geometrical themes and combinations; finials, palmatiums, rosettes, stars, disks, circles, zigzags, ribbons, imbrications, etc. (16; 17; 18).

Note 3. See Palace of Firouz-Abad.(Volume I, page 409).

Note 1. See facade of Takht-i-Bostan. Also Figs. 14; 16.

Note 2. See Hatra. The taste for monsters already appeared in the Mesopotamian and Achemenide epochs.(Volume I, pages 148, 422). As a result of the great exportation of the products of the artistic industries of Sassanian Persia, it was carried on with India and China, as well as with the Byzantine empire and western Europe, which imitated the types represented in the g goldsmith's work and the fabrics.(16; 18).

[illegible]

[illegible]

[illegible]

24 Book II. Christian Architectural Styles of the Mediaeval East.

The career of mediaeval architecture in the Christianized c countries of western Asia, of north Africa and of the eastern Mediterranean was determined in the greatest measure, on the one hand, by the number and nature of the requirements increased by the advance of the new religion; on the other, by the a action of the riwal esthetic forces, which constituted in the first two centuries A. D. the partial Hellenization of the peoples of Asia Minor, Syria and Egypt, the reaction of their national genius against the Grecian influence, and finally the radiation from the Mesopotamian-Persian East under its Parthian and Sassanian form.

Chapter 1. The Christian Impulse.

I. Requirements.

If the original Christianity had not been developed, its triumph would have been injurious to architecture. In principle, it reduced the religious rites to prayer and to works of charity, and it no more conceived the need of a temple, than of a rite or a priesthood. "It is not the place, that sanctifies t the man", proclaimed one of its doctors; "it is the man who s sanctifies the place". Origen clearly stated; "we desire for our God neither temples non statues; we leave these to the demons."

25 In truth, the need of an appropriate place was implied in t the institution of prayer in common, justly appreciated as the best means of realizing, for an instant at least, the ideal fraternity and the communion in the divine. But to cite the words of Denys of Alexandria, "all places were good; a field, an inn or a prison!" Practically was utilized the house of a wealthy member of the community or even a cavern in the catacombs.

Yet when the multitude of those affiliated compelled an enlargement of the "oratory"; particularly when the edict of 313, transforming the persecuted faith into the official religion, had carried it within the circle of imperial Roman solemnity, architecture was desired to erect assembly halls, otherwise called churches, which by their appearance as well as by their capacity, were appropriate to the new situation. The necessary

complement of an episcopal church, and from the 6 th century, that of many ordinary churches, was a baptistery.

On the other hand, as Christianity deviated from the spirit to the letter, was inclined to ritual practices turned to superstition, its dependence on architecture always increased. It needed churches commemmorating the events of the life of Jesus; funerary churches (cellae trichorae, martyria) in which to celebrate the anniversary of the beath of a saint or martyr -- a category with a prodigious development, when in the 6 th century became general the worship of relics; finally, innumerable chapels at places where the tutelary or malicious gods, disguised by Christian names, continued to be honored by the people people. Let us add that at places of pilgrimages were hospices (pandocheia, xenodochein); that the clergy were required to teach and required schools; also note that nothing was held more meritorious, than the erection of religious edifices.

From the 4 th century, the practice of hermit life, the invention of Egyptian devotion, was adopted with enthusiasm by Syria, Mesopotamia, Asia Minor, and soon by all Christendom, instituting an enormous demand for monasteries.

II. Religious Programmes.

Doubtles, more than one community yielded to the temptation to utilize the assembly halls of the constituted bodies of the empire or of the cities, especially the spacious basilicas [1] for the use of exchanges or courts, even the temples of the v vanquished deities.

Note 1. Volume I, page 458.

Note 2. The appropriation of the temple for a purpose the reverse of its own was realized in various ways. Sometimes the general arrangement was retained, adding an apse.(See Temple of Rome and Augustus at Ancyra, and the Parthenon); sometimes the intervals between the columns of the peristyle were w walled up, and by piercing doorways in the lateral walls of t the cell, there was obtained an interior in three aisles. (See Temple of Concord at Agrigente); sometimes was erected an enclosure concentric with the peristyle, which become the great nave after the removal of the cell. (See at Aphrodisias). As examples of the utilization of civil edifices, let us cite at Rome, S. Adrian on the Forum, (hall for the sittings of the

Senate), Holy Cross of Jerusalem (a hall of the Palace Sessorianum) etc.

It was no less fated, that the latter should furnish the models indicated for the new structures.[3]

Note 3. For example, see what occurred at Gaza, when the b bishop S. Porphyrius decided to build a church there; the majority were of the opinion to erect it "in the image of the temple of the idol".

Yet the plan of the pagan sanctuary, the temple of a deity, could not satisfy the need of the new religion for interiors sufficiently vast to contain a multitude, and so unobstructed that no one should fail to see the altar and hear the sermon. Therefore the art of building not only owed to the accession of Christianity the opening of a grand career, but was further indebted to it for an energetic inducement to advance. Indeed, the religious programmes proposed to it comprised the satisfaction of numerous and varied needs, an active search for picturesque effects, and particularly the solution of problems resulting from the covering of a great interior.

Substantially, the worship required a consecrated enclosure; a preliminary space in which the faithful could prepare themselves, especially by washing the hands, "which prayer must raise toward God", for entering the "House of the Lord"; an arrangement of the latter permitting the clergy to deliver homilies and readings; for the faithful to participate in a communion commemmorating the Last Supper; finally, a distinct place for each class in the community; for the governing committee (priests) presided over by the bishop; for the supervisors of good works (deacons and deaconesses); for the active members (Christians); for the probationers (catachumens), who sometimes awaited their admission for years, and for the penitents, excluded for a longer or shorter time -- all authorized to listen from afar to the hymns and sermons, but excluded at the b beginning of masses and of the communion.

This programme was realized by Christian architecture in the basilica, whose primitive and normal composition was the following.(19,1).

20 The church proper was preceded by a great court (atrium), paradisus, parvis), almost always square; and whose entrance was

sometimes monumental (propyleum); a basin (cantharus, phiale) occupied its centre, and it was surrounded by porticor. This area before the facade was occupied by probabioners (catachumens) and penitents, to whom the use of great curtains placed at the doors allowed or prevented a view of the church, according to the place in the ritual. Also frequently and especially in the East, they found places in a vestibule (narthex) occupying the entire width of the edifice. This, the basilica proper, generally comprised three and sometimes five aisles, separated by columns supporting the roof. The middle aisle w was wider than the others (collaterals, side aisles), which it exceeded in height, so that a space resulted in which to p pierce the windows. In the East the left side aisle (with reference to the faithful) was reserved for the women (gynaikon).

At the rear end of the greater aisle was the place of the sanctuary, denominated in the West, sanctuarium, presbyterium, tribunal [1] or concha; in the East, adyton [2], abaton [3] or bema. [4] This was a semicircle (apsis, apse), provided with a bench on which sat the priests, with a throne (cathedra) for the bishop, at the middle of the curve. The dignity of the place was indicated by a great arch (arcus triumphalis), crossed by a beam supporting a cross and a chandelier. Before it and on the axis of the edifice was an altar, sheltered by a columnar pavilion (ciborium), whose openings could be closed by curtains. Between the altar and the area occupied by the faithful (quadratum populi), a space for the singers (chorus psaltentium, s schola cantorum) was enclosed by a barrier (cancelli), at the sides of which projected two pulpits (ambons) for the reading of the sacred texts and the sermon.

Note 1. Because of the analogy of its purpose to that of t the corresponding part in the Roman civil basilica, where the judicial magistrate sat. (See Volume I, page 459). Also Vol. III.

Note 2. The secret place.

Note 3. The inaccessible place.

Note 4. The platform, because its floor was raised by one or more steps.

The establishment of a gallery at mid-height in the elevation of the side aisles was very rare in the West, but was appreciated in the East for the facility it afforded, both for placing notable persons apart from the multitude and for applying

the oriental principle of separation of the sexes, by restricting the women to the gallery (gynaikonitis).

In the East, where the worship comprised more ceremony, and where in the course of the 5 th century was developed a part of singing and one of drama [5], at the expense of homoletic instruction, the programme just analyzed introduced complicatioons (19,2; 91,7). On both sides of the apse and opposite the side aisles were opened apses, that on the South being the diakonikon or apodosis, and that on the North being the prothesis, the former serving as a sacristy, and the latter as the p place of preparation of the sacred articles, which at the proper moment were solemnly borne into the sanctuary. ("Grand entrance"). On the other hand, the sanctuary was closed by the screen of a portico with curtains or a high barrier for exposing the sacred images (pergula, Iconostasis), in the middle of which was placed a "sacred gate".

Note 5. Commemmoration of the Passion by the eucharistic s sacrifice.

Note 6. For the orientation, see page 29.

The need of a presbytery of large dimensions -- particularly urgent when the church was monastic -- or the desire for finding place for the tomb of a martyr sometimes determined the i insertion between the sanctuary and the nave, of a transverse aisle (transeptum), which might project beyond the lateral walls of the edifice, sometimer terminating in an apse, like the great aisle. [1] (19,3).

Note 1. Evidently the plan of the Christian basilica was d derived from that of the edifice of the same name, that in the Hellenistic cities and at Rome served as forum, exchange and tribunal. Volume I, page 458.

Chapels were often consecrated to the archangels Michael and Gabriel, particularly regarded in the East as "attendants at the throne of Christ" and guardians of the "House of God on e earth"; so they were freely placed on towers adjoining the church or not, that from these elevated posts, they "could see everything at all times"; as for bell towers, no mention of t them is made before the 7 th century.

The baptistery was near the church. Often designed on a great scale, in accord with the importance of the ceremony of w

which it was the scene, and with the practice of total immersion of the converts, its programme normally distinguished a v vestibule, in which the proselytes renounced Satan, and a hall, in the centre of which was excavated a font.

Memorial and funerary churches were frequently realized on a concentric or radiating plan; this was sometimes a rotunda or octagon, which might be extended by an annular side aisle sometimes containing galleries (19,8); sometimes a basilica w with triple sanctuary (trichora cella, triconchos sigma), i.e., furnished with three apses arranged in cross form, according to an arrangement adopted from the throne halls of oriental a and Roman palaces [2] (19,6); sometimes a cross-shaped nave (19,7). Rarely, the plan was that of a pasilican type, differentiated by the addition on the front end of an apse symmetrical with the normal one (19,8). The relics were preserved in a crypt (martyrium, confessio, crypta), accessible by a stairway.

Note 2. See the Palaces of Treves, Milan and Maschita.(See plan of the latter, Fig. 63,7.

The elaboration of Christian religious programmes employed in large measure symbolical preoccupations; thus although the rule permitted exceftions, particularly in the early times, t the officiating priest must face the East. At first the primitive rite placed him facing the faithful, so that the church found itself located like the pagan temple, i.e., having its entrance at the East (19,4). From the 5 th century, a ritual revolution originating in the East reversed the position of t the with his back toward the faithful, so that the orientation was reversed, and the axis of the church extended from West to East (19,5).

Frequenhly and especially in the East, the proportioning of the edifices was influenced by the desire of employing the mystical numbers, 3, 7, 8 and 12. [1]

Note 1. 3 = the Trinity; 7 = seven days of creation, the s seven gifts of the Holy Spirit, and the seven sacrements; 8 = eight beatitudes; 12 = the apostles.

Similarly for the plan; the octagonal form, so frequently a applied to the basilica, was recommended by the meaning attributed to the number 8. [2]

Note 2. See Latin vesses in text attributed to S. Ambrose or S. Ennodius.

Particularly and especially in the East, was a tendency to shape the church in the image of a cross, for the same reason that imposed on a person praying the lateral extension of the arms. [3] (19,7).

Note 3. "Our prayers will be quickly heard, if our body represents Christ, who thinks of us." (S. Ambrose).

Let us examine some significant texts.

Chuciform churches are expressly mentioned as "in the image of a cross." Describing a church projected by him, S. Gregory of Nyssa writes, that it is (see text). Adamnus-Archlph says of a church in Palestine, that"it is in four parts, in the image of a cross." The life of S. Porphyrre recalls that the Church of Gaza is in the form of a cross. In regard to the S. Apostles at Constantinople, Procopius observes, that the plan comprises the crossing of the two axes in the shape of the cross, and that the eastern arm is elongated, by which the form of the cross is sufficiently produced.

Zonaras informs us, that Justin II added to the Basilica of S. Maria of Blachernes an apse at the north and one at the south, "in order that the church should be in the shape of a cross (see text).

The inscription prepared by S. Ambrose for the dedication of the Apostles built by him at Milan about 382, is sufficiently explicit. (See Latin original in text of Note).

Chapter 2. Esthetic Impulses.

The development of mediaeval architecture in western Asia, northern Africa and in the eastern basin of the Mediterranean, we have stated to be conditioned by concurrent influences, composed on the one hand of Hellenism and its extensions into Asia Minor, Syria and Egypt; on the other, of the peculiar temperament of the peoples of these countries, and the radiations of Mesopotamian and Persian genius under their Parthian and S Sassanian forms.

Hellenism was one of the forces of Christian civilization in the places considered by us. In the Egean region, the theatre of Byzantine life, its effect was as powerful as prolonged. In Asia and in Africa, although not equal by much, it was no less real and general; favored by the establishment of immigrants and of Grecian sovereigns after the expedition of Alexander, it kindled in those countries -- particularly at Ephesus, Antioch and Alexandria -- ardent centres of Hellenizing civilization, more or less impregnating with its spirit the superior class, to which must fall the dogmatic and priestly direction of Christianity.

Yet it was necessary for the esthetic ideal of these colonies of Hellas to respond to what the latter had conceived. Far from manifesting the native taste, the Hellenic importation a adapted itself to this. There resulted from it hybrid formulas, that illustrate, for example:-- in Asia Minor the placing of churches in the centre of an enclosure surrounded by internal porticos; [1] in Palestine, the alliance of Grecian and Phoenician-Semite elements exhibited by the tombs of the vicinity of Jerusalem; [2] in Syria, monuments of the Roman period with entablature raised in an arch above the central intercolumniation, with abundant ornamentation and flat sculpture; [3] at Alexandria, the fanciful monumental relief, an idea of which is given by the mural paintings of Pompeii and the Nabatean ruins of Petra. [4]

Note 1. Volume I, page 280.

Note 2. Volume I, Book 4, second Part.

Note 3. Volume I, Book 4, Part 2.

Note 4. Volume I, Book 4, Part 2.

More efficient still was the competition offered to Hellenism

by the revived Mesopotamian-Persian, that we have already defined. Indeed, from about the beginning of our era, whatever aspect of civilization be considered, there is observed an increasingly energetic radiation from the genius of the Mesopotamian and Iranian peoples over the Greco-Roman world. In the domain of economic, religious, social and political life, it is marked by an afflux more and more considerable, of the natural or manufactured products of central and eastern Asia; by a rapid propagation of the worship of Mithra as far as the eastern frontiers of the empire and by an incessant advance in l
32 luxury; by the completed organization, in the time of Diocletian, of an entirely Asian administrative pomp; by the establishment of Diocletian at Spalato and of Constantine at Byzantium. As for the architecture, it is manifested by the introduction of construction in burned bricks into Asia Minor, and even to Rome; [1] by that of the domical covering into Asia Minor, Syria and Rome; [2] by the fashion of abundant ornamentation, of flat sculpture, of adventitious ornament, and of the polychromy, for example, that is revealed by the monuments of Syria, of Alexandrine products after the beginning of our era, the P Palace of Diocletian at Spalato, etc. [3]

Note 1. Volume I, Book 4, Part 2.

Note 2. Volume I, Book 4, Part 2.

Note 3. Volume I, Book 4, Part 2.

This reaction of the native original ideas, that expansion of the Mesopotamian-Persian East, must benefit the career of Christianity. Was the new religion not an invention of the o orientals of Palestine, developed by the orientals of Syria, Egypt and Asia Minor? Was it not fated to behold in Hellenism and detest an appearance of the abhorred paganism? [4]

Note 4. For example, compare the Hellenophobia of the Alexandrine clergy, revealed by the barbarous destriction of the monuments of the city and the murder of the philosopher Hypatia (425 A. D.).

33 Part II. Principal Architectural Styles of Western Asia and of Christian North Africa.

Section I. Christian Architecture in Upper Mesopotamia and Syria.

I. I. Architecture in Upper Mesopotamia.

The history of the architecture found in upper Mesopotamia forms a transition between the study of the Sassanide East and the Christian East. Scarcely commenced, the architectural exploration of that region (21,2), which under the name of Osrhoene was at the beginning of the middle ages a centre of civilization and a focus of Christianity, has revealed monuments of the greatest interest; at Wiranschehr (Constantina), a great c church (5 th - 7 th centuries); at Diarbekir (Amida), which r rivaled Edessa and Nisibe, two notable churches (5 th - 7 th centuries) -- the Nestorian Church and Church of the Virgin; in the canton of Djebel Thur Abdin, southeast of Diarbekir, v various sanctuaries aud monasteries (5 th -7 th centuries),-- Mar Augen, Mar Gabriel, Mar Yakoub, El Hadra at Kakh, etc.

These churches consist of a nave, sometimes elongated on the
34 axis of an Eastern apse (20,1), sometimes transversely with t three sanctuaries (20,2). [1] There also exists a central and r radiating plan, which forms a square beneath a dome, opening into four halls in cross form (20,3,4; 28,5).

Note 1. Transverse naves were common in ancient Mesopotamia. See Volume I, Fig. 77.

The construction is often of very good quality, applying Mesopotamian-Persian methods. The walls are of well jointed stones; the openings covered by a lintel or a frequently stilted arch, sometimes raised or even slightly pointed in Persian form. The covering is protected by a roof in two slopes covered by tiles, and is either a tunnel vault with a stilted or elliptical curve or a dome, sometimes on an oval plan (20,4). This was fitted to its support by trumpets, and was made of bricks connected by thick beds of mortar. It is the same for the tunnel vault above the point -- carried as high as possible -- at which the horizontal courses cease.

The effect is required from mouldings with contrasted profiles; from wrought capitals; from abundant ornamentation consisting of sculptures in low relief, but sunken, paintings and m mosaics. The decoration associates Hellenistic, Persian and

symbolical motives -- acanthus, rosettes, scrolls enclosing a animals, vine branches, the vase of life etc.

II. Architecture of Christian Syria.

Chapter 1. Requirements. -- Monumental Chronology a and Topography.

Much more thickly inhabited than in our time and indeed cultivated beyond the actual limit of the desert; enriched by a great commerce in the transit of the products of Mesopotamia, Persia, India and even of China, to destinations in the Mediterranean countries, Syria offered to architecture from the beginning of our era and for six and a quarter centuries a vast and varied career. For the wealthy citizens were required beautiful dwellings and monumental tombs; the number of the cities increased in astonishing proportion in the 4 th, 5 th and 6 th centuries, [1] and these required useful or luxurious arrangements, the taste for which they contracted under Roman administration; [2] finally churches and monasteries in abundance, for a population that passionately professed Christianity from the 4 th century, and was a nursery of priests and monks.

Note 1. In northern Syria are counted in an extent of forty leagues a hundred new cities dating from that epoch.

Note 2. Volume I, page 437.

The series of structures for religious purposes was begun in the second quarter of the 4 th century under the energetic impulses of Constantine and of the empress Helena. In every locality of Palestine made sacred by some event of the life of Jesus were erected churches, "as tokens of the victories of t the Lord"; [3] -- Churches of the Annunciation at Nazareth, of t the Nativity at Bethlehem, of the Holy Sepulchre at Jerusalem, of the Ascension on the Mt. of Olives. Elsewhere were erected, at Antioch the "Great Church", founded in 331 and finished under Constantius, basilicas at Tyre and Damascus; in northern Syria the churches of Hass, Kherbet Hass, Roueina and of Fafirtin (372); in the Hauran those of Oum-idj-Djemal (345) and of Tafka.

Note 3. The comparison is that of S. Jerome.

The work of the 5 th century is known by the Convent of Chagga, the Churches of Babiska (401), Dar-Kita (418), Mschabbak, Kokanya and Sedjilla -- all erected in the second half of the

century; that of Khamsir in the region of Djebel Hass and Djebel Shbet, and particularly by the grand group of the Church and Monastery of Kalat Sem'an (S. Simeon Stylites) at the northeast of Antioch, all dated from latter part of the century.

The transition from the 5 th to the 6 th century is recalled by the Church of Baquoza southeast of Antioch; the beginning of the 6 th by the Cathedral of Bosra (completed in 511-512), dedicated to Ss. Sergius, Bacchos and Leontius; by the Church of S. George at Ezra (finished in 515)-- both in the Hauran. To the 6 th century further belong; in Syria west of the Jordan, the Churches of S. Sergius and of S. Stephen at Gaza; in northeast central Syria, the Churches of Zebed, and of Mu"allak at the foot of Djebel Hass, and the particularly successful ones of Tourmanin (recently destroyed) and of Kalb-Louzeh. L Let us also cite as contemporary with the reign of Justinian a Church on Mt. Gerizim southeast of Samaria; at Jerusalem the
36 Church of the Virgin and the Triumphal Gates (propyleums) of the sacred enclosure of the Haram; [1] a Church at Kasr-ibn-Wardan between Aleppo and Homs (564).

Note 1. At the south is the "Double Gate"; at the east the "Beautiful Gate"(Orai pyle), called by the West the "Golden Gate".

As evidence of the secular demands remain a quantity of houses, often nearly intact; parts of cities; baths, and in the n north of central Syria are very numerous tombs, many of which are very important.

The prosperity of the Christian architecture of Syria suffered in the 7 th century from the invasions of the Persians (610-618), [2] and it did not survive the Mohammedan invasion (633-638) [3]

Note 2. The latest inscription is of the year 609.

Note 3. From the middle of the 7 th to the end of the 11 th century nothing was produced. The crusaders found standing only the Church of the Resurrection and the Convent of S. Mary at Jerusalem, and the Basilica of Bethlehem.

Chapter 2. Natural and Human Conditions. -- Influences. -- Schools. -- Epochs. -- Radiation.

I. Natural and Human Conditions.

Stone abounds in Syria; in the western and northern regions, it is a stratified limestone iy thick beds, easily cut, and t toward Antioch, finely-grained and hardening in the air. The eastern portion of northern Syria (Djebel Hass and Djebel Shbet) and the region of central Syria beyond Jordan afford hard stone, especially basalt. Certainly the north of Syria was n not then deforested as now, and its inhabitants could at great expense, it is true, obtain magnificent timbers in the forests of Lebanon and of Amanus; however it appears that in the course of the 6 th century, wood became more and more scarce. On the other hand, woody materials were wanting beyond Jordan. Let us recall, that among the characteristics of the country, figures the dry heat of the climate and the frequency of earthquakes.

Human conditions found by architecture in Christian Syria w were very favorable. Secular demands were liberally provided for, and further for religious programmes, enthusiasm controlled their execution and conception. The civilization was brilliant; minds were very cultivated, acute and full of energy; [1] scientific knowledge was considerable; technics very developed. It came from an era of great structural activity, and benefited by the experience acquired in the course of the work created by the monumental magnificence of Antioch, Baalbec, Palmyra, Bosra, Djerach, Ammon etc. [2]

Note 1. Remember that the centre of Hellenistic culture was Antioch.

Note 2. Volume I, pages 437, 447.

II. Influences.

The career of the architecture of Christian Syria was the r resultant of three forces; Hellenism, natiwe originality, and the influence of the Mesopotamian-Persian East.

Hellenism had fascinated the upper classes and the radiation from Antioch, its powerful and charming capital, survived paganism. Yet there was no assimilation, the mass of the people had not been affected; even among the Hellenizing class, the Semetic mind remained entire and the traditions of growth were

prominent. The triumph of Christianity precepitated a reaction against Egean intrusion, which brooded for a long time, and to which contributed important Arab immigrations. [1] The movement favored the influence of the Mesopotamian-Persian E East, which must be more effective, since Syria was economically dependent on the Sassanian empire, and being allied to the peoples of the region of the Tigris and the Euphrates, it was accessible to their esthetics.

Note 1. This is manifested by a rapid reaction from the c Greek language to the Aramean in Syria. See pages 98, 99.

In brief, the architecture of Christian Syria takes from H Hellenism what it exhibits in logical construction; from the Mesopotamian-Persian East its taste for vaulted covering as well as the conception of the effect by sculptured details (pages 54, 66, 67); finally from the incient indigeneous basis, certain methods of construction and of decoration (pages 49, 64, 66). There was still an intervention of Byzantine a art, but in minute proportions.

III. Schools. -- Epochs.

The work of Syrian architecture reveals the existence of s several provincial schools and a regular evolution, indicating life and progress.

The coast from Antioch to Gaza and the country west of the Jordan were relatively Hellenizing.

The north portion of the central region, south and east of Antioch, divided between Grecian and oriental tastes, gave an increasing advantage to the latter; its course dates from the 3 rd century, and it attained its climax in the decline of the 6 th. It produced masterpieces (Kalb Louzeh, Kalat Sem'an). There may also be distinguished two regional units, one located in the district of Djebel Riha, the other in that of Djebel Barisha.

The plateaus of Djebel Hass and of Djebel Shbet, on the east of the provinces previously mentioned, from the 4 th to the 7 th century were the scene of an inferior architectural production, differentiated from that of northern Syria by practices demanded by the special geological conditions. [1]

Note 1. These districts have nomaterial other than basalt.

For similar reasons, the Hauran forms a fourth province, v

very oriental, [2] and in certain respects the most original; established in the 3 rd century, its formula was not evolved.

Note 2. Because of a strong Arab immigration (see Part II, Sect. I; Arab Architecture before Mohammed; pages 98, 99).

IV. Radiation.

The radiation from the architecture of Christian Syria was considerable; it impressed enegertically on the one hand Coptic Egypt and especially northern Africa, Byzantium and northern Asia Minor; on the other being the Mohammedan schools of Syria, Egypt, Maghreb, of Asia Minor, of the Seljouks, and t the Ottoman empire. It further affected western Europe, particularly Italy on the Adriatic. (Volume III). (20, 3).

Chapter 3. Programmes and their Realizations.

I. Secular Programmes.

Civic Programmes.

The arrangement of Syrian cities is characterized by a method of Hellenistic origin, the furnishing of the streets with porticos, attached to the houses or separate, and of opening a great central avenue bordered by galleries.

Domestic Programmes.

In a general way, domestic programmes were conceived in the oriental fashion. As far as possible, the habitation was isolated from the exterior, opening on a court enclosed by a b blind wall (23,1). In the cities, the lack of space compelled the erection of houses with facades on the street, with b balconies bearing an enclosure, the prototype of the Mohammedan mushrabiyehs.[2] (23,7). (Page 209).

Yet the distribution was not alike in the south and the north. In the Hauran, the court was enclosed on three sides by two-story buildings, the upper being accessible by internal and external stairways. (Volume I, page 485, Fig. 323). The selamlik was formed by a great hall, as high as the house; the harem by the chambers, and if for sleeping, these were furnished with alcoves and small closets arranged in the thickness of the walls. Separated by a corridor, the khan comprised t the kitchen, cellars, stables and cisterns.

In northern Syria, the distribution was different and more monumental; it more fully distinguished the common room from the dwelling; often it gave to the entrance the proportions of a deep portal with benches at the sides, even those of a pavilion with a crooked passage and a porter's lodge (23,1,4, 5,6,8); finally it placed the house lengthwise and divided in the second and ground stories into a series of large rooms a and a wide portico with piers or columns (23,1,2,3). In the country, villas were decorated by a garden, enclosed on the side next the dwelling by a portico of vertical stones connected by horizontal stones,and supporting a trellis. The family tomb frequently rose in the garden.

Funerary Programmes.

According to the native tradition, which was otherwise in conformity to the rocky nature of the soil, Christian Syria

constructed a tomb most frequently by an excavation; sometimes level at the sides; sometimes in the crypt at the end of an excavation with a front arranged as a facade or portico ((24,12); finally sometimes in the depth of the earth, either laterally in a well or at the end of a stepped passage, whose entrance was closed by a heavy slab (24,11), or occasionally sheltered by a structure in the form of a canopy (24,7). In the extrem north of the country, the tomb was often masked by the erection of a massive stele, or rather of a pair of columns or of piers connected by an entablature.(24,8).

Under the open sky, a tomb nearly always consisted of a square chamber, occasionally with a second one above it, in which niches received the coffins (24, 1,2,3,5,6,10); a portico sometimes preceded the facade in which was pierced the doorway (24 4,10). There may be counted a certain number of examples of the realization of the motive of a monumental sarcophagus, raised on a platform or covered by a canopy (24 9,13).

II. Religious Programmes.

The normal plan of a Syrian church was that of a basilica [1] orientated from west to east, and rarely divided in five, but commonly in three aisles, the middle one being wider than the side aisles (25). At the east curved an apse, which was ordinarily flanked by two small apses. [2] West of the Jordan and in the Hauran, it projected from the rear of the edifice [3] (25 1-4); but in the remainder of central Syria, it was the rule [4] for the rear of the church to terminate in rectangular form, the three apses being actually included within a rectangular mass [5] (25, 9, 10,12,19), or that the principal one w was distinguished by two recesses from the little rectangular apses ranging with it [6] (25, 6,7,8). Rarely rectangular and sometimes polygonal [7] (25, 8), it exceptionally took a horseshoe form. [8]

Note 1. See page 27.

Note 2. See page 28.

Note 3. See the Churches of Tafka, Chagga and Sumeda.

Note 4. As examples, we cite the Churches of Kalb Louzeh and of Kalat Sem'an.

Note 5. See the Churches of Behio, Hass, Deir Seta and Kherbet Hass.

Note 6. See the Churches of Babiska, Baquoza and Tourmanin.

Note 7. This was a hexagon at Tourmanin.

Note 8. Church of Zebed (511).

43 44 The Church of Bethlehem (25, 11) and an inscription at Bozra, dated in 487, are evidence that in the 4 th and 5 th centuries, Syria made use of the trefoil plan (page 29).

45 In the Hauran, the three aisles were of the same height, and the side aisles were divided into two stories (26, 3); in the remainder of Syria, the height of the central aisle exceeded that of the others, but was but little more than that of the apse (26, 1; 32).

The Church of Kasr-ibn-Wardan (25, 19) presents a Syrian r realization of the central basilica with dome and galleries, familiar to Asia Minor and to Byzantine art. (Pages 73,148).

The school of northern Syria is characterized by a mode of opening on each side facade one or two doorways preceded by columnar porches, [2] and by a tendency to multiply windows in the wall of the apse and in those of the side aisles (26, 1; 21; 32; 22; 27).

In Syria west of the Jordan, the programme of a great church comprised an "atrium" [3] (25, 13). It was the opposite in central Syria. The school of the north sometimes arranged a portico along one of the longer sides of the edifice. [4] (25, 16). More frequently and especially on the northern borders of its area, this constituted a projection on the entire length of the facade; in plan it was sometimes an open porch (26; 25, 17,21; 34, 3), an enclosed vestibule, either as wide as the church, or reduced laterally by two halls or by two pavilions (25, 18,19,20,23; 34, 4-6); the elevation comprised at mid-height an uncovered terrace or a gallery, that was somet-
46 imes flanked by two towers (34, 4,5,6). We recognize there a native motive, realized two thousand years earlier by the "h "hilani" of the Hittite palace.[1] ; in the 9 th century B.C. by the "elam" of the Temple of Solomon; [2] toward the beginning of the Christian period by the front portion of the Temple of Baalsamin at Siah (26, 21); in the 2 nd and 3 rd centuries by Roman edifices, like the "Kabyle" of Omm-es-Zeitoun (34, 1). On the other hand, we discover in it, if not the model, at least the prototype of the facade of the Romanesque and Gothic

churches. [3]

Note 2. See the Churches of Betoura and of Roueiha.

Note 3. See page 27.

Note 4. See the Church of Babiska and the Chapel of Rbelah.

Note 1. Volume I, page 152.

Note 2. Volume I, page 167.

Note 3. Volume III.

From the 4 th century, witness the Church of the Resurrection at Jerusalem and the "Great Church" of Antioch; in the 5 th, the evidence of the Church of Wiranshehr (28, 5); at t the transition from the 5 th to the 6 th -- the octagonal Church of S. George at Ezra (28, 2; 31, 7,9); that of Mt. Gerizim are proof that the central and radiating plan was familiar to the religious architecture of Syria. When the conception was monumental, a high octagonal drum, pierced with windows in its uppor part and supported by a series of columns or piers, was placed in the interior of a square (page 30) or c circular nave, from which projected at the end of the orientated axis an apsidal sancturay, flanked or not by little apses (31, 7,9). Sometimes as at Antioch the elevation comprised balconies. A cross-shaped radiation [1] was realized at Kalat Sem'an by opposing in pairs on opposite sides of an octangonal court, of four naves, the eastern being devoted to the same service. (29; 21).

Note 4. In this case an arrangement of the exedras produced in the interior of the junction of the nave to the central dome (28, 1,2; 31, 7).

In conformitory to the obligation laid on the monks to live absolutely in "community", a Syrian monastery does not contain cells, but was divided into several great halls for use ar refectory and as dormitories, which abutted against the enclosing walls and received light from a central court. It was not rare for these to have but one story. (29).

Chapter 4. Construction.

The architects of Christian Syria were exferienced, conscientious and skilful constructors, interested in progress, and further well informed concerning Hellenistic and Mesopotamian=Persian experiments.

49 I. Materials.

Conditioned on the geology, their construction was in the greatest measure in stone, and even exclusively so. A combination of bricks and stone is observed only in edifices erected under foreign influences. [1]

Note 1. See the churches of Constantine in western Syria and the Church of Kasr-ibn-Wardan, which evidently depends upon the Hellenistic art of Antioch.

Indeed, Syria always had at command excellent quarrymen and stonecutters. [2] It was not rare, that the ground story of a house was excavated in the rock, and that the second story w was built with the excavated materials. To economize the operations of cutting, blocks of large dimensions were freely quarried. [3] For the same reason, an irregular jointing was p permitted, particularly in basaltic regions, where the rock split into angular blocks. Mortar of lime and of gypsum was used.

Note 2. See those of the Canaanite and Phoenician epochs. (Volume I, pages 161, 169).

Note 3. The piers of the Hospital of Tourmanin are monoliths of square section 14.8 ft. high and 1.97 ft. wide. At K Khanasir, a basalt lintel measures 13.4 ft. long, 2.3 ft. wide and 3.05 ft. deep.

II. Procedures.

The Wall and the Portico.

Frequently in ordinary construction, the materials were employed as they came, and there resulted an apparent polygonal construction. In this case, there was a jointing with mortar and a filling of crevices by stone spalls (30, 3).

Horizontal jointingrarely included the regulation of the c courses and the correspondence of the joints; this did not p prevent it from being very stable and often very beautiful. Always set dry and without cramps, it presented in the north the refinement of connection by projections and recesses. (30, 1,2,4,5).

Let us note as a characteristic peculiarity of Syrian architecture its taste for corbelling, particularly in northern Syria, that liked the column standing on a corbel (32).

An opening was freely spanned by a lintel, relieved by an arch, and in case of a window, they liked to hollow out its lower part so as to create the appearance of an arch (30, 8, a,b). But the jointed arch was also employed.

Ordinarily, the arch had no extrados and the voussoirs penetrated more or less deeply into the mass of the walls (30, 7). With a view of facilitating the execution and increasing the stability, it was carried as high as possible by corbelled courses (30, 6). If the opening was small, the arch was sometimes composed of three blocks. The oriental school of northern Syria constructed its arches in the Roman manner by means of a concrete of stones and mortar. Until the 7 th century, the normal form was an arc, generally semicircular and very frequently stilted, sometimes raised. Then prevailed t the pointed arch with two centres, [1] doubtless imported from Mesopotamia, and appreciated for the reduction of both the thrust and the load on the centres during construction.

Note 1. In the choir of the Church of the Holy Sepulchre at Jerusalem, completed in 1150, there exists not a single a arch, that is not pointed.

For the realization of the isolated support, the column and the pier competed, one being a monolith, the other being of one block or constructed; the first always dominated in the north and the second in the Hauran.

Except in the north and for small spans, the crowning of a portico was rarely an architrave, to which a curvature sometimes gave the form of an arch. Generally it was an arch, semicircular or stilted, and which in case of a colonnade rested directly on the capital by the mediation of an impost block.[2]

Note 2. See further on page 61 the precautions taken to arrange for the imposts a bearing on the capital.

One of the most characteristic traits of the art of building in Christian Syria, and one most indicating its ascendency a and its powers, is the variety of the methods of covering applied by it and the combination of several frequently made f for the same edifice.

The use of a carpentry roof was possible only in the extreme north of Syria, in the vicinity of the wooded mountains of A Amarus. Everywhere else it was forbidden by the lack of trees, unless in the Maritime cities by reason of the facility of importation, and at Jerusalem, or because of the prestige of the place neither the trouble nor the cost was considered. They were freely arranged in the form of an ovoid shell. [3] Careful to reduce the spans of its trusses, the school of northern Syria arranged for them the support of corbels projecting from the walls.(31, 4,5; 32). Sometimes division walls were placed on great transverse arches, projected above the roof, facilitated the covering and formed an obstacle to the transmission of fire (31, 4).

Note 3. Witness the wooden dome, that the texts inform us was constructed over the Great Church of Antioch in 526; that constructed by the evidently Syrian authors of the Kubbet-es-Sakhro at Jerusalem; (see further page 224), and again that covering the thin walls of the Cathedral of Bosra.

The geological nature of the country invited a covering of stone. Actually, Syrian construction applied the system of the ceiling of slabs supported by corbelling or borne on arches, that was known to the Parthian school (page 16), and which had been utilized in the Roman epoch. [2] (31, 1); that of the vault jointed in tunnel form, recommended by Roman experience; that of tunnel vaults on partitions, familiar to Sassanian Persia. [3] (31, 2). The realization of a shell of brickwork was exceptional, confined to the frontiers of the desert, [4] and was doubtless determined by a Mesopotamian or Byzantine influence.

Note 2. Volume I, pages 486, 487.

Note 3. See the substructure of the "Haram" at Jerusalem. For the Persian application, see page 166

Note 4. See the ruins of Kasr-ibn-Wardan.

The solution of the problem of the covering of a square interior by the expedient of a calotte seems to have tempted t the architects of mediaeval Syria; they attempted the cloister vault, the shell in jointed masonry, that in small stones connected by mortar, that of bricks, a dome on a drum, and f finally the cross vault.

Only one example of the first method is known, offered by the Pretorium of Mousmiye.(Volume I, page 498). The second may be observed in the Roman ruins of Djerach (Gerasa) (31, 10,11) and at the gates of the Haram at Jerusalem, which date from the reign of Justinian (31, 12,13); indeed the covering of the apse is achieved by a quarter sphere, characterized by false joints and a progressive diminution of the heights of the blocks in proportion as they approach the summit (22; 32). The pagan Chapel of Omm-es-Zeitoun (282 A.D.) (34, 1), and t the Church of S. George at Ezra (31, 7) are still covered by domes in concrete; that of the former is hemispherical and r rests directly on the walls of the nave; that of the second is ovoid in the Mesopotamian-Persian fashion, aud is raised on a drum pierced by windows. It was the same for the dome, constructed in bricks over the Church of Kasr-ibn-Wardan.

The difficulty of joining a calotte of circular plan to a square or octagonal drum was solved in various ways; sometimes -- witness S. George of Ezra -- the angles were cut off by ceiling slabs, repeating the operation until the polygon produced had enough sides to afford a support for the base of t the shell (31, 6,7); sometimes the cut off angle was obtained by the artifice of an angle trumpet in the form of a niche ((31, 7), very much employed at the beginning of the Mohammedan epoch; sometimes was preferred the artifice of the pendentive, witness the gates of the Haram at Jerusalem; translating into stone an Asian formula conceived for bricks, spherical triangles were laid up with horizontal beds, which system is peculiar to Syria (31, 10-13).

As for the cross vault, which became the usual mode of covering after the Mohammedan conquest, it was executed in rubble jointed with mortar, with a corbelling of the courses at the joinings of the panels. [1] (31, 3).

The contradiction of a method of vaulted coverings on centerings and of a scarcity of wood, sometimes extreme, was certainly reduced by that Syrian ingenuity, of which certain actual procedures give an idea. "In our time in Syria", states M. Choisy, "the centering of a vault consists of horizontal poles fastened by the ends to forked verticals. The whole is covered by bundles of sticks and a coating of earth reducing

well or badly the irregularities of the surface. Thus is obtained an economical support, though flexible and that can be deformed. The mortar joints crack by the deflections, if they have set before the entire completion of the work. This danger is guarded against by finishing the vault in a single day; as many masons assemble as permitted by the extent of t the yard; they commence work before day and continued for a part of the night, if necessary. In this way the movements of the centering only affect the masonry while still fresh' this masonry changes form without cracking; and when this commences to harden, the vault is closed at the vertex and no l longer needs these auxiliary supports".

The Syrian roof was a terrace in the Hauran (31, 1); in the northern portion of the country was a roof in two slopes or a shed roof covered by tiles, according to whether the nave was isolated or abutted against a higher aisle (31, 4,5; 32); Sometimes it was realized in stone by means of slabs cut in a manner to cover each joint.

Chapter 5. The Effect.

With regard to the effect, the architecture of Christian S Syria appears as remarkable as for the constructiou. An analysis of its works leads to four statements; it was very much preoccupied with the appearance of the exterior, almost as m much as that of the interior -- which distinguishes it from its Asian relationship, and allies it to the Egean and European family; in the Hauran and particularly in the eastern portion of the northern region, it was clearly restricted by the hardness of the basaltic materialr; its conception of the beautiful was thoroughly architectural; subjected to the influence of Mesopotamian-Persian Asia and to the action of Hellenism, which in the north radiated strongly from Antioch, but likewise orientated by the energetic impulses of the native genius, it commenced by placing its mark on the classical formula, and then it manifested its individuality by inventions.

It never sought to impress by material grandeur; programmes as careful as those of the Churches of Tourmanin and Kalb Louzeh did not comprise dimensions exceeding 114.8 to 121.4 ft. for the length or 52.5 to 59.1 ft. for the width.

On the other hand, it possessed in a very high degree both the taste and the feeling for the effects of harmonic order and for those of picturesque character in the monumental harmony.

I. Effects of Harmonic Order.

It It loved and succeeded in regular and symmetrical arrangements inscribable within rectangular proportions, and outlines were commonly demanded from arithmetical combinations a and geometrical constructions. Thus the dimensions, figured in feet, were whole numbers, preferably chosen for mystical reasons of pagan or Christian conception -- among those multiples of 3, 4, 5, 7 and 12, [1] or fractions of a number exactly divisible by one of these. The ratios were very definite and simple -- frequently that of 2 to 1; finally, they liked to base the determination of positions and directions on the "Egyptian" triangle.(38). [2]

Note 1. See page 20. At S. George of Ezra, all the sides are multiples of 3, or one-third of a number divisible by 3. (60; 33; -- 24; 27; 12; 15; 18; 11).

Note 2. See Tourmanin and Kalb Louzeh.

II. Effects of Monumental Relief.

No trait better characterizes and recommends more the productions of Syrian architecture, than the character, both picturesque and architectural, of their general form and their secondary relief.

The monument was always enhanced in effect by its elevation on a base of greater or lesser height with vertical sides (34, 5,6; 24; 22; 27), and in the north of central Syria, the eyes and the mind were impressed by the qualities of the relief, varied and accented on the one hand, on the other being harmoniously balanced and logically harmonized with the internal arrangements. Such were especially the appearance, both so happy and so novel, that the churches derived from the projection of the apse and the little apses, the latter being smaller than the former aud of different shape (22; 27); from the projection of a wide flight of steps from the facade and sometimes of lateral porches (25, 14,22; 34, 5); from the height of the middle aisle above the side aisles and the apse; particularly in certain cases (34, 3-6) from the arrangement of front porticos, which we have previously explained, [1] (page 45), with the shady space of its wide vestibule indicating t the principal aisle, the rise of its angle towers before the side aisles, and at the mid-height of the elevation, the terrace, sometimes with a gallery above it.

These grand effects were supported by the energetic assistance of a secondary relief, varied and accented. Then were the numerous splayed windows and doorways, and frequently the opening was repeated at reduced size above the lintel (35, 2, 7); the recesses of the niches already liked in the Roman epoch (35, 1); the scale of solids and voids developed by real or imitative porticos (34, 4,5; 35, 5; 27); the strong projection of mouldings continued horizontally as limits of zones; (34, 3-6; 35, 1,5; 22; 27), or according to a very original mode, native to Syria, bordering the openings like a band (35, 1; 22); the great prominence of tablets or of caps abowe the rect.ngular openings (35, 3,7); the wide projection of the main cornices, supported by a closely spaced row of either c corbels or of small columns, or of these in alternation, of

columns standing sometimes on corbels, sometimes on the tops of supports resting on the substructure (35, 1,8; 27). The last arrangement was very happy and very characteristic of S Syrian apses, announcing six centuries in advance one of the typical peculiarities of Romanesque architecture, and recalling that of niches and of arcades pointed out in our analysis of the art of building in Sassanian Persia. (Page 18).

III. Effect by Reliefs of Details.

The effect by details in relief are very sympathetic in the Syrian school. But when it concerned a useful member, the f form was in large measure rational and expressive in its function.

In that respect, the modeling of the isolated support is v very significant. If a pier, it sometimes presented the organic form of a bundle of stems, each of which had its separate load (36, 5). If a column, its shape was determined by i its purposes. The shaft was sometimes stumpy. The base was profiled in Ionic taste and was well extended, particularly the capital was appropriate to its work of bearing one end of the architrave or of the imposts of a pair of arches; frequently -- the arrangement is very characteristic of the school -- its mass throws out two lateral consoles (36, 2); sometimes -- the expedient is notable in the 6 th century, [2] and it announces the end of the pagan epoch [3] -- the necessary enlargement was obtained by the superposition of an impost block, cut in the form of a truncated pyramid. [4] (36, 4-6).

Note 2. See Tourmanin.

Note 3. See a capital of the Temple of Baalsamin at Sieh.

Note 4. The expedient of the impost block is eminently characteristic of Byzantine architecture. Page 154.

Its properly ornamental relief was no less characteristic of Syrian esthetics. Subordinated to the satisfaction of structural requirements, it was rather heavy.

Frequently the appearance realized by it was derived from Ionic or Corinthian, that differed from the originals by simplifications, by alterations, and even by combinations. The most remarkable peculiarities, in case of the adoption of the Ionic fashion, was the placing of a group of volutes above a great hemispherical cushion (36, 3), and when a Corinthian f

formula was chosen, a flat, lean and dry modeling, comprising breaks rather than curves (36, 7); the development of a wrought pad at the base of the bell; the substitution of a zone of scrolls for the second row of foliage; and the replacing of the Greco-Roman acanthus by a more slender variety, piquant and not toothed (36, 7); the association of the motive of the acanthus with another, borrowed from the desert flora, t that of a lanceolate and rigid leaf, whose pointed end is abruptly recwrved like a crocket (36, 7,9,14).

A second category might be formed with some original compositions of a plant or geometrical form; a series of flat leaves, erect above a collar of fluted sepals and with round ends, in the taste of the motive exhibited by the Egyptian palm forms and by the Hellenic basket form [1] (36, 1); a truncated cone enclosed by four leaves lying beneath the angles of the abacus (36, 12); a block with concave sections (36, 11); a c calyx grooved by oblique flutes (36, 13); an ovoid volume with reticulated surface (36, 4); the appearance of a Corinthian bouquet springing from a hemispherical netted bell (36, 10).

Note 1. Volume I, pages 97, 364.

A notable trait of the relief of the Syrian capital was a mode of inclining the foliage of the sides, as if affected by a gyratory current of air (36, 7,9).

The profiles of Syrian mouldings (37) are subject to some ideas of logical construction, some being from the native tradition and the others from Hellenic inspiration; let us note as characteristic forms a great roll, already appreciated by Phoenician art; [2] a sort of cyma, that in the course of its career the school made more and more projecting at top and s swelled at the bottom, and which combines both a Hellenistic= Roman form and the Egyptian cavetto; [3] a formation of the main cornices, nothing else than an excellent arrangement for the rejection of rain water (37, 1).

Note 2. Volume I. 110, 1.

Note 3. Volume I. Pages 509, 82.

IV. Effects of Ornamentation.

As much as any other oriental architecture, that of Christian Syria loved ornamentation.

When so permitted, it sought for the interior the effects

the costly and gleaming materials, that it required from marble facings, from pavements and coverings in mosaics, [1] and from metal overlays. [2]

Note 1. It employed mosaics, even on the exterior; witness the Basilica of Bethlehem and the facades of several churches at Jerusalem represented on a topographical mosaic discovered at Madaba.

Note 2. Note the application to the Church of Antioch of the adjective "golden", and contemporary descriptions of the Church of S. Sergius at Gaza and of the Sanctuary of S. Simeon Stylites (Kalat Sem'an).

At least it utilized stucco, which was tinted or covered by ornamental or significant frescos, the latter devoted to edifying illustrations of christian dogmas and display.

In the Hauran and in the east of northern Syria, where it was opposed by the hardness of a basaltic material, its favor fell to relief decoration, determined by the practice of construction in stone and by that lucid knowledge of the loss of the art of building, of which so many proofs have been collected, and also doubtless by the happy influence of Hellenic e esthetics.

As friezes, cornices, bands, enclosures of openings, it developed rich, but not refined compositions, with conventional treatment and symmetrical arrangement (38; 40).

Limited to ornamental themes, the repertory of Syrian sculptors drew from the fourfold sources of Hellenistic models, f from Mesopotamian-Persian types, Hellenistic models, geometrical combinations, and from Semetic, Mesopotamian-Persian and christian symbolism. On the one hand, the acanthus and the scroll; on the other, the triangle, zigzag, disk and rosette; further, guilloches, interlacings, ropes, knots and complex network, that show the Mohammedan arabesques and polygons; (page 250); finally, vine branches, grapes, pomegranates, a vase between peacocks or doves, drinking life therefrom, and from which often rises vine branches (tree of life); the cross, the monogram of Christ, a winged disk stamped with the same signs (39).

The style of Syrian sculpture is very characteristic, the prototype of that adopted by the Byzantine school, otherwise

being thoroughly Asian. Confined to very low relief, even to sinkings and to engraving, it was detailed with a firm chisel, with the freedom and dryness of goldsmith's work, toothed and fluted foliage, lean and scarcely projecting, when not flush with the stone. Yet it was wisely detached from the ground by clean and deep cutting, an efficient producer of hard outlines and strong shadows (38; 40). In brief, the Syrian conception of relief ornamentation tended to realize a stone embroidery, equivalent in effect to the mural tapestry always loved by the East.

68 Section II. Christian Architecture in Asia M Minor outside the Egean Provinces.

Chapter 1. Requirements. -- Conditions.

I. Requirements. — Monumental Chronology and Topography.

The introduction of Christianity into the central [1] and the southern [2] provinces of Asia Minor produced architectural demands there far superior to those of the Hittite and Hellenistic civilizations. [3] These countries adopted the new religion with enthusiasm; particularly Anatolia, which distinguished itself by its ardor in building sanctuaries, as much as by i its love for theological speculations and its fertility in d doctors of the Church. [4] Religious architecture continued very actively there until the time of the invasion of the Seldjouk Turks in the decline of the 11 th century (1072). Unfortunately, an accurate appreciation of the results is not yet possible, because the inventory of the monuments is far from being complete, and their chronology is very uncertain. [5]

Note 1. Cappadocia, Lycaonia and Galatia.

Note 2. Pisidia, Pamphylia, Lycia, Isauria and Cilicia.

Note 3. Volume I, pages 150, 253 - 256.

Note 4. In Cappadocia and Lycaonia, certain regions are l literally encumbered by churches, chapels, oratories and monasteries.

Note 5. The relevation of the singular historical importance of the Christian architecture of Asia Minor is due to M. Strzygowski. (See his worxt - Kleinasien, ein Neuland der Kunstgeschichte. 1903).

A first group comprises:-- in Cappadocia, [6] the Churches of Nazianzos, of Nyssa [1] (14 th century); of Sivri-Hissar (5 th century), of Tchanli-Kilisse (8 th century ?), of Tchurken, of the Forty Martyrs near Skupi, of Utschayak, and the numerous rock-cut sanctuaries, particularly in the canton of Gereme (at Doghali-Kilisse); in Lycaonia, the Churches of Dikeli Tasch (4-5 th centuries), of Ala-Klisse near Konieh, those of the Kara Dagh (Binbirkilisse --"the 1001 churches", Madenshehr, Daouleh and Mahaletch), and the Church of Firsendyn south of Karaman; in Galatia, the Church of Jürme, S. Clement of Ancyra (9st half of 8 th century); on the borders of Armenia, the Churches of Trebizond, erected after the installation of Com-

is sounds and its meanings. Let us further note at the exture- of workers of the provinces the Queens of Idiomers at Nineveh.

Note 8. Sappodocia was a nursery of "saints of the Church", the creating of Xanthosian, Geology of Xyaes, Email of Beerseen.

cot of a mortgage monument for his native city, commissioned by Queen of Nineveh to his friend Amphicoriss, bishop of Ic- [illegible], 4th.

It was another province for an example in Phrygia, the Inscriptions of Dagalassos (4 th century); in Paphylia, those of Perge (4 th century) and of Adalia (Mosque of Diumanaum-dzo- ani) (5 - 7 th centuries); in Lycia, those of Alexandjor Daila, of Dere Ahmy (Kasaaba) (7 th century) and of K. Nicolas at Ky- ra (7 th century); in Isauria, those of Isaura, of Dere, of Kelkana Kalessi (4 - 5 th centuries); in Cilicia, those of [illegible] (?) and of Korykos (Korykos; 4 - 5 th centuries).

II- [illegible]

The [illegible] of the Hellenistic [illegible] of Asia Minor was determined by matrix traditions, neither superposed on by [illegible] aboriginal [illegible] but rather [illegible] aboriginal conscession, that facilitated invasions from Mesopo- tamia, Persia and Syria.

*Yet an extreme diversity of types and of methods, and the [illegible] of numerous regional varieties attest a large prop- [illegible] [illegible] [illegible]

Comnene in the city (1204) -- the Panagia Krysokephalos, Hagia Sophia and Sa Eugenios. let us further note at the extreme northeast of the peninsula the Church of Koimesis at Nicea. (8 - 9 th centuries).

Note 6. Cappadocia was a nursery of "doctors of the Church". See Gregory of Nazianzen, Gregory of Nyssa, Basil of Seseraea.

Note 1. See the description of the first by Gregory of Nazianzen in the panegyric of his father, and the curious project of a martyr's monument for his native city, communicated by Gregory of Nyssa to his friend Amphilochios, bishop of Iconium.(Migne, Patrologie Gr. XXXV, 108).

In the southern portion may be cited:- in Pisidia, the C Churches of Sagalossos (4 th century); in Pamphylia, those of Perge (4 th century) and of Adalia (Mosque of Djoumanaum-djoumi) (5 - 7 th centuries); in Lycia, those of Alaidjor Jaila, of Dere Ahzy (Kassaba) (7 th century) and of S. Nicolas at Myra (7 th century); in Isauria, those of Isaura, of Derbe, of Kodscha Kalessi (4 - 5 th centuries); in Cilicia, those of Hierapolis Kastabala (4 th century), of Komideli (Konytelideis) and of Korghos (Korykos; 4 - 5 th centuries).

II. Conditions. -- Influences. -- Radiations.

The orientation of the Christian architecture of Asia Minor was determined by native traditions, neither encroached on by Hellenistic expansion nor Roman action; by the geological condition of a soil rich in stone materials; finally by a geographical conformation, that facilitated invasions from Mesopotamia, Persia and Syria.

Yet an extreme diversity of types and of methods, and the existence of numerous regional varieties attest a large proportion of originality. Considering the antiquity of the monuments, the peculiarities of plan and of construction, that we shall give, present a historical interest of the first order.

There are strong reasons for believing, that the Christian architecture of Asia Minor energetically influenced the development of the Byzantine (page 139) school, and contributed to the progress of Romanesque art. (See Volume III).

Chapter 3. Programmes and their Realizations.

[illegible] rames; those of a normal basilica, of a semi-central basili- [illegible]

[illegible] aisles, the middle one being wider and terminated by an apse. This was pierced by windows, as well as the lateral facades. Several examples exist with two aisles and having a part of a second side aisle, whose purpose was doubtless funerary. There was no atrium; but most of the plans arrange a vestibule in the Syrian [1] and Hittite [2] fashion (42, 6-10). The opening of doorways in the longer sides was normal. Galleries were rare, accessible by stairways placed at each end of [illegible] of the edifice. (43, 7-10). [3]

Note 1. See page 4[illegible].

Note 2. See Volume 1, page 153.

Note 3. See the Churches of Diner, of Jurus, No. 2 at Bin- [illegible]

[illegible] ement of the portion reserved for the clergy by the annexat- [illegible] The restoration of the space for the faithful was sometimes compensated by the arrangement of galleries (45, 5).

Note 4. See the Churches of Kadesche Kalesei, of S. Nicolas at Myra, of S. Clement at Ancyra and of Kalmesis at Nicea. Also S. Sophia at Salonica (page 148).

Note 5. See S. Sophia, work of Anthemios and of Isidoros, [illegible] (Page 139).

The adoption of a mode of covering by a dome included the [illegible] toward the sanctuary (45; 45, 5,6).

[illegible] to the third formula (44, 8-15). [1]

[illegible] of Trebizond etc.

Chapter 2. Programmes and their Realizations.

Christian Asia Minor realized four kinds of religious programmes; those of a normal basilica, of a semi-central basilica, of a central church and of a radiating sanctuary.

The first (42) generally comprised a division into three a aisles, the middle one being wider and terminated by an apse. This was pierced by windows, as well as the lateral facades. Several examples exist with two aisles and having a part of a second side aisle, whose purpose was doubtless funerary. There was no atrium,; but most of the plans arrange a vestibule in the Syrian [1] and Hittite [2] fashion (42, 6-10). The opening of doorways in the longer sides was normal. Galleries were rare, accessible by stairways placed at each end of the porch, which therefore projected from the general outline of the edifice. (42, 7-10). [3]

Note 1. See page 45.

Note 2. See Volume I, page 153.

Note 3. See the Churches of Diner, of Jurme, No. 2 at Binbirkilisse.

The second type [4], perfected at Constantinople by the labors of two masters from Asia Minor [5], is distinguished by an enlargement of the portion reserved for the clergy by the annexation of the first bay of the nave to the apse (43; 45, 5,6). The reduction of the space for the faithful was sometimes compensated by the arrangement of galleries (45, 5).

Note 4. See the Churches of Kadsche Kalessi, of S. Nicolas at Myra, of S. Clement at Ancyra and of Koimesis at Nicea. Also S. Sophia at Salonica (page 148).

Note 5. See S. Sophia, work of Anthemios and of Isidoros, the first originally from Tralles and the second from Miletus. (Page 139).

The adoption of a mode of covering by a dome included the arrangement of a square enclosure in the vicinity of the nave toward the sanctuary (43; 45, 5,6).

This is formed by four arches in churches designed according to the third formula (44, 8-15). [1]

Note 1. See the Churches of Binbirkilille (43, 11), one of those of Konytelideis (113, 1,3); those of Siori-Hissar, of the Forty Martyrs near Skupi, of Itamush, of Tchouli Kilisse, of Trebizond etc.

Sometimes it was a rotunda (43, 1);[2] sometimes . rotunda or an octagon flanked by an apse (43, 2); more frequently for s symbolism, the plan was cross-shaped, either with four arms projecting from a central enclosure (43, 5,7), or two aisles crossed (43, 6,8), [6] or finally the arrangement of an edifice on a square plan comprised two aisles at right angles. [7] (43, 11,12). The programme of an octagon was sometimes complicated by a side aisle supporting galleries. [8]

Note 2. See a Church at Hierapolis.

Note 3. See at Derbe and Isaura.

Note 4. See page 30.

Note 5. See Church of Nyassa and octagonal No. 8 at Binbirkilisse.

Note 6. See several Churches at Binbirkilisse. The favor enjoyed by this type is revealed by examples presented by the rock-cut oratories of Anatolia.

Note 7. See the Baptistery of Aladscha Kiele, the Churches of Ala Klisse, of Tchanla Klisse and of Firsondyn.

Note 8. See the Church of Nazianzen.

Chapter 2. Construction.

I. Materials.

Where nature favored this, the Christian architecture of A[illegible] Minor was freely rock-cut; according to the locality, an artificial grotto was excavated, or an isolated rock was hollowed out; sometimes a work of sculpture produced the external appearance of a constructed monument (48, 10,12; 45, 3).

But stone and rubble were of ordinary materials; bricks were only employed for lack of stone materials,[1] sometimes as a contrast for decorative purposes. In Lycia, doubtless determined by the influence of the Hellenistic cities of the western coast, is observed masonry with alternate courses of rubble and of tiles, with vaults of burned bricks.[1]

[illegible]

Note 1. See Church of Here Ahzy.

II. Methods.

But stone masonry was generally of good quality, sometimes being even refined and bold (48, 8,4).[2] Jointing with mortar [illegible] lately in the southern region, where the antique tradition survives.

Note 2. S. Gregory of Nazianzen notes that the joints of [illegible] of [illegible].

Note 3. Note that the method used by the author of the octagon No. 8 of Binbirkilisse, of opening stadoms in the projecting angles of the elevation (48, 8,4).

[illegible]

[illegible] has with a relieved lintel, and sometimes with an arch (48).

The construction of the arch comprised an extrados and the [illegible] number of voussoirs was reduced to the minimum. The curve f formed a semicircle, which was sometimes stilted.(45, 1).

[illegible]

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Chapter 3. Construction.

I. Materials.

Where nature favored this, the Christian architecture of A Asia Minor was freely rock-cut; according to the locality, an artificial grotto was excavated, or an isolated rock was hollowed out; sometimes a work of sculpture produced the external appearance of a constructed monument (43, 10,12; 45, 3).

Cut stone and rubble were of ordinary materials; bricks were only employed for lack of stone materials, [1] sometimes as a contrast for decorative purposes. In Lycia, doubtless determined by the influence of the Hellenistic cities of the western coast, is observed masonry with alternate courses of rubble and of tiles, with vaults of burned bricks. [1]

Note 1. S. Gregory of Nyssa expressly says so. Yet his l letter informs us that bricks were appreciated on account of the possibility thereby afforded for vaulting without centres. Besides the edifice referred to in that document, we can cite only the Church of S. Clement at Ancyra and that of Utschayak.

Note 1. See Church of Dere Ahzy.

II. Methods.

Cut stone masonry was generally of good quality, sometimes being even refined and bold (45, 3,4). [3] Jointing with mortar wes common; but they likewise built with dry joints, particularly in the southern region, where the antique tradition survived.

Note 2. S. Gregory of Nazianzen notes that the joints of the edifice built by his father did not exceed the thickness of a hair.

Note 3. Note that the method used by the author of the octagon No. 8 of Binbirkilisse, of opening windows in the projecting angles of the elevation (45, 3,4).

The buttress was in current use.

An opening was sometimes constructed with a lintel, sometimes with a relieved lintel, and sometimes with an arch (46).

The construction of the arch comprised an extrados and the raising of the springings as high as possible. Sometimes the number of voussoirs was reduced to the minimum. The curve f formed a semicircle, which was sometimes stilted.(45, 1). [4]

Note 4. The base of the stilted semicircular arch forms o

[illegible]

[illegible] of bricks or of concrete (see Gossonian Architecture, [illegible] stone, indicates a case of the phenomenon of a transposition of the structural order into a decorative order.

The isolated support rather was a pier than a column; the portico was an arcade.

The Covering.

[illegible] the southern region, exposed to radiation from Syria. [illegible] in the same edifice.

Note 3. Note above the side aisles of the Church of Kodeo- [illegible] of stone slabs on transverse arches. (Page 16).

The former, whose profile was often a stilted arch, was sometimes strengthened by transverse arches (46, 3).

[illegible] hemispherical, pyramidal, conical or conoidal. Sometimes for [illegible] the was made, sometimes by the expedient of corbelled slabs, producing a cut-off angle, [3] sometimes by that of an angle trompet, [4] occasionally by that of a pendentive, [5] and even by a combination of two modes. [6] As an artifice for consolidation, we may cite an abutting by longitudinal tunnel vaults, or by parts of the structure (43, 44, 6-15), [8] as well as an extension of the base of the dome into a mass, from which externally results the appearance of a drum (46, 6). [9]

[illegible]

Note 2. See Church of Kodeoseen.

Note 3. See Church No. 9 at Binbirkilisse and an edifice at Kodeleton.

[illegible]

one of the characteristics of the Christian architecture of central Asia Minor. (Note the adoption of the form for the p profiles of tunnel vaults and the plan of the apse), at the same time being a certain indication of its submission to oriental influences. The fact that the form is related to the masonry of bricks or of concrete (see Sassanian Architecture, page 12), and that the construction of Asia Minor is in cut stone, indicates a case of the phenomenon of a transposition of the structural order into a decorative order.

The isolated support rather was a pier than a column; the portico was an arcade.

The Covering.

The covering by a stone ceiling was rare, being confined to the southern region, exposed to radiation from Syria. [5] The tunnel vault and the dome were common, sometimes being associated in the same edifice.

Note 5. Note above the side aisles of the Church of Kodscha Kalessi, an application of the Syrian system of ceilings of stone slabs on transverse arches. (Page 16).

The former, whose profile was often a stilted arch, was sometimes strengthened by transverse arches (45, 2).

The second was circular or polygonal in plan; in elevation, hemispherical, pyramidal, conical or conoidal. Sometimes for purposes of lighting, it was elevated on a drum pierced with windows and placed on a square [1] or polygonal plan (45, 5). [2] When the drum was not circular, its connection with the calotte was made, sometimes by the expedient of corbelled slabs, producing a cut-off angle, [3] sometimes by that of an angle trumpet, [4] occasionally by that of a pendentive, [5] and even by a combination of two modes. [6] As an artifice for consolidation, we may cite an abutting by longitudinal tunnel vaults.[7] or by parts of the structure (43; 44, 8-15), [8] as well as an extension of the base of the dome into a mass, from which externally results the appearance of a drum (45, 6). [9]

Note 1. See Church of Kodscha Kalessi.

Note 2. See Church of Nazianzen.

Note 3. See Church No. 9 at Binbirkilisse and an edifice at Mahaletch.

Note 4. See Church of Kodscha Kalessi.

Note 5. See Churches of Dere Ahzy and of S. Nicolas at Myra.

Note 6. See S. Clement at Ancyra.

Note 7. See S. Clement at Ancyra.

Note 8. See S. Nicolas at Myra.

Note 9. See S. Clement at Ancyra.

Chapter 4. The Effect.

From the point of view of the effect, the architecture of Asia Minor appears differently, according to whether one views the southern slope of the peninsula or the central provinces; in the first case being more luxuriousness and more Hellenized; in the second more sober in ornamentation and guided by a vision of the constructors and tending to innovations. In both parts is observed a Syrian influence, which competes in Anatolia with the persistence of the native tradition and the radiation from Mesopotamian Asia.

I. Effects of Monumental Relief.

We note -- as very interesting in themselves and by the tendencies manifested by them -- certain refinements in general and secondary monumental reliefs in the Syrian-oriental taste.

Thus the rear mass of the church is generally accented by a strong projection of the apse, curved in semicircular or very frequently in horseshoe form (42, 2); always in the southern region, more dependent on Syria, the apse was attached to a polygonal plan [1] (42, 3), rarely being included within the b body of the edifice (42, 1,4). [2]

Note 1. See the Churches of Kasteli, Hierapolis, Sagalassos, Dere Ahzy, and S. Nicolas at Ancyra.

Note 2. See the Church of Kodscha Kalessi; those of Kanykos and of Kanytelideis.

On the other hand, the facades were animated by a multiplication of doors and windows -- often according with the internal divisions into three unequal aisles (46); by a frequently used system of twin or multiple openings (46, 1,2,4,6); by t the recesses of niches (46, 4); by the projection of porches on consoles (46, 2); by the projection of a substructure, and by the relief of pilasters at the angles and on the facades [1] (46, 5), of engaged columns, [2], of cornices, and in Anatolia, of repeated bands (46, 1,6); [1] by the flat or hollowed arches, simple or with reveals (46, 3,5). [2]

Note 1. See the Church of Forty Martyrs near Skupi and the Church No. 43 in Binbirkilisse.

Note 2. See Church of Tchanli-Kilisse.

Note 1. This multiplication of monumental mouldings, as m much as their profiles, is very characteristic of the Anatolian architecture of Asia Minor.

The Gnostic school of Asia Minor is recommended by a relatively overwhelming feeling for effect by means of materials; wildness are evidence of Asiatic monkishness, simple, yet profound the logical selection of the prey.

That is because on an impost can is accessible a prism with [illegible] the [illegible] of the [illegible] to be assessed, and which it [illegible] in [illegible] a fashion of a textured column (42, 3). [illegible] they are commonly covered by a degenerated Corinthian [illegible] with "[illegible] [illegible] [illegible] [

Note 2. See Church of Tchanli-Kilisse.

The Christian school of Asia Minor is recommended by a relatively developed feeling for effect by relief of details; w witness the profiles of Anatolian mouldings, simple, yet producing contrasts of light and shade (47); as further proof, the logical modeling of the pier.

That is crowned by an impost and is sometimes a prism with rectangular section placed transversely to the main axis of the aisle, flanked by an engaged column on each narrow side (48, 8-11,14); [3] sometimes being a body membered in accordance with the imposts of the arches to be sustained, and which it receives in picturesque fashion on a detached column (48, 6). [4] As for the columns, they are generally heavy; in the southern regions, they are commonly covered by a degenerated Corinthian capital or a composite with flat scholls; in Anatolia their heads are generally massive imposts (48, 1-4).

Note 3. This relief is eminently characteristic of the architecture of central Asia Minor; it is also found on the mullions of twin windows.

Note 4. See Church of Kodscha Kalessi.

II. Effects of Ornamentation.

As for the effect of the sculptured ornamentation, the architecture of southern Asia Minor differs from that of the central regions in the twofold matters of proportion and of realization. The first of these is rather singular, and it is c conceived in the Hellenistic-Syrian taste; it is particularly applied to the enclosures of doorways. The second sacrifices very little to elegance, and its decorative repertory comprises little more than geometrical forms of quite rude conception and execution, and that are incontestably crude (49). [5] The two schools freely employ a motive already dear to pagan Asia Minor, a fluting imitating a rigid leaf with rounded tip. (49, 2).

Note 5. See the motives represented in our drawing (49) w with the forms dear to Phrygian and Paphlagonian Asia Minor in the prehellenic epoch.(Volume I, page 218).

The decoration was essentially in color; the stucco formed the external surface of the best constructed walls, and commonly served as a support for paintings, very frequently for

significant frescos.[1] Facings of marble and mosaics were rather rare.[2]

Note 1. See the numerous and important frescos, that still cover the walls of the rock-cut sanctuaries of Anatolia.

Note 2. See the Koimesis at Nicea.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Influences. -- Radiation.

1. Requirements. -- Monumental Chronology and Topography.

Evangelized in the last quarter of the 3 rd century by S. Gregory the Enlightener, the peoples of the mountainous regions bounded by the Black Sea, Anatolia, upper Mesopotamia, the Caspian Sea and the Caucasus, otherwise termed Armenia a [illegible]

[illegible] tain the history of an important structure of King Tiridates at the beginning of the 4 th century.

But from the beginning of the 5 th century, the Christians or Armenia were exposed to the persecution directed against them by the Persians, and necessarily the demand felt its effects. From that epoch dates, if not the elevation restored at the beginning of the 7 th century, at least the plan of the "patriarchal" Church placed in the middle of the Monastery of Etchmiadzin (now Valarsapat).

The 7 th century was an epoch of structural activity, particularly in the pontificates of the patriarchs Komitas (from [illegible]) and of Nerses III (640-661). The first rebuilt the Cathedral of Etchmiadzin, erected at the same place the Churches of S. Pipsimus ([illegible]) and of S. Gaian (638-640). The second, [illegible] the relics of the apostles of the country, and which forms an [illegible]

To the beginning of the 8 th century is attributed the construction of the Church of Gsunial ([illegible]), with which is [illegible]

[illegible] ed through a period of advance and prosperity, particularly in the last two-thirds of the 10 th century,[1] and in the beginning of the 11 th. From the first half of the 10 th date the Church of the Monastery of Akhmar on the shore of Lake [illegible] at Ardzen (997-991). The production of the first half of the

82 Section III. Armenian Architecture.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Influences. -- Radiation.

I. Requirements. -- Monumental Chronology and Topography.

Evangelized in the last quarter of the 3 rd century by S. Gregory the Enlightener, the peoples of the mountainous regions bounded by the Black Sea, Anatolia, upper Mesopotamia, t the Caspian Sea and the Caucasus, otherwise termed Armenia a and Georgia, as a result required the services of religious architecture. Some ruins at Garni in the region of Ervan retain the memory of an important structure of king Tiridates at the beginning of the 4 th century.

But from the beginning of the 5 th century, the Christians or Armenia were exposed to the persecution directed against them by the Persians, and necessarily the demand felt its effects. From that epoch dates, if not the elevation restored at the beginning of the 7 th century, at least the plan of t the "Patriarchal" Church placed in the middle of the Monastery of Etchmiazdin (now Valarsapat).

The 7 th century was an epoch of structural activity, particularly in the pontificates of the patriarchs Komitas (from 618) and of Narses III(640-661). The first rebuilt the Cathedr.l of Etchmiazdin, erected at the same place the Churches of S. Ripsimus (618) and of S. Gaian (628-640). The second, named the "builder", in particular built near Etchmiazdin a 83 Church of S. Gregory the Enlightener for the preservation of the relics of the apostles of the country, and which forms an important document for the history of Armenian architecture.

To the beginning of the 8 th century is attributed the construction of the Church of Usunlar (718-728), with which is doubtless contemporaneous that of Dighour.

Under the dynasty of the Bagratides (859-1080), Armenia passed through a period of advance and prosperity, particularly in the last two-thirds of the 10 th century,[1] and in the beginning of the 11 th. From the first half of the 10 th date the Church of the Monartery of Aktamar on the shore of Lake Van, and that of Pitzounda,[2] on the coast of the Black Sea; from the second, the Church of Mokwi and that of Holy Cross at Akhpat (977-991). The production of the first half of the

11 th was important; the Church of Koutais (1003), ruined by the Turks in 1691; edifices at Ani, the capital of the kingdom, sacked by Alp Arslan in 1064 -- Cathedral (1010), Chapel of S. Gregory, Chapel of the Redeemer (1041); Monastery of M. Marmashen, north of Adrainopol; churches of Soundjerli (1033-1044), of Nikortsminda, under the reign of Bagrat IV (1027-1072). To the third quarter of the century belongs the Church of Samthavis; to its decline, that of the Monastery of Ghelat.

Note 1. Reigns of Ashot III, of Sembat II and of Gagik I, who were princely builders.

Note 2. At least for the plan.

Then the production diminished; churches of Ertatchminda, of Ikorta (12 th century); porch-mausoleum of Church of Holy Cross at Akhpat (1183); Monastery of Kosha Vank near Ani (end of 12 th and beginning of 13 th century); Church of S. Gregory at Ani (1215).

In 1222 raged the Mongol invasion, and the architectural w works of Armenia were then very little; upper Georgia was less attacked; Monastery of Safar above akhalsykh, with a Church of S. Saba (1306-1334).

The 17 th century was marked by numerous additions of porches, that disfigured many ancient churches.

II. Conditions. -- Influences. -- Radiation.

A region of high mountains and exposed to rainy winds from the Black Sea, Armenia opposed to the art of building the severity of a variable and damp climate with an indifferent civilization. On the other hand, it was possessed of two favorable conditions; great facilities for obtaining wood and very good stone materials; an intelligent and active people.

By its religious dependence on Asia Minor [1] and on southern Syria, [2] its natural exposure to invasion from Anatolia, Mesopotamia and Persia, finally by its location, which made it a strategic position incessantly disputed by the Sassanian a and Byzantine empires, it was fated for its architecture to be affected by competing influences, on the one hand from the arts of Asia Minor, Syria and Byzantium, and on the other from the Mesopotamian-Persian, Sassanian and Mohammedan schools.

Note 1. Nerses the Great, Catholikos from 340 to 374, was a disciple of S. Basil of Cesarea.

Note 2. Mediaeval Armenia possesses important Syrian colonies.

Until about the 10 th century, the former dominated; then the latter prevailed. Hence the necessity for distinguishing two epochs in the history of Armenian architecture, one preceding and the other following the 10 th century.

Yet the Armenian style radiated in several directions and affected very distant countries, its expression being favored by the prestige of its monasteries and by the emigration of a part of the inhabitants of Ani, north of the Caspian Sea, into the Crimea, Galicia, Moldavia and Poland, [1] after the taking of their city by the Seldjouks (1064).

Note 1. These Armenian colonies have maintained themselves until our time.

It certainly furnished Seldjouk Anatolia with formulas of construction; [3] Russia with programmes and also doubtless with masters; [4] Servia and Moldavia-Wallachia with models of decoration, [5] perhaps it was not foreign to the evolution of the Byzantine school after the 10 th century. [1] Finally, without its being possible to derive fixed conclusions from this, it is a fact, that the general appearance and various peculiarities of the Armenian churcher give them a striking resemblance to the more recent edifices of Carlovingian and Romanesque Europe. [2]

Note 2. The porch is a later addition (51).

Note 3. See pages 207, 225.

Note 4. See pages 260, 262, 263, 266, 267, 269.

Note 5. See pages 273, 276, 282.

Note 1. See page 140.

Note 2. See Volume III.

Chapter 2. Programmes and their Realizations.

Armenian religious programmes are characterized by a mode of central and radiating composition.

It appears in the plan of the most ancient church known, that of Etchmiazin (52, 1); a nave with a central bay defined by four arches supporting a dome, with four projecting arms terminated by apses; these are semicircular in the interior and pentagonal externally; the eastern one is utilized for t the rites and is flanked by the little apses required in the East. [3]

Note 3. See the analagous composition of the Church of Ateni and of Martvili (11 th-12 th centuries).

From the same principle proceeds the ordinary arrangement of the funerary commemmorative churches; [4] that of S. Gregory the Enlightener near Etchmiazin shows in the interior of a r rotunda a combination of a square on four piers and of exedras on colonnades, from which results a quatrefoil outline. (52, 2).

Note 4. See Chapel of S. Ripsime at Etchmiazin.

Even in the oblong churches based on the basilican type with three apses, this tendency is evident in the entire extent of the country and in all times. Indeed in consequence of t the arrangement of a part of the nave in an elevated form with arches opened toward the side aisles as well as toward the sanctuary and the entrance, all are more or less clearly central and radiating; sometimes -- as at Dighour, Usunlar and Ani (52, 4,8,6) -- since the nave comprises but three bays, there is equalized distribution lengthwise and transversely; or again -- for example at Koutais -- the projection of the two great lateral apses placed on the axis of the square realizes a cross-shaped form (52, 7); sometimes as at Pitzounda, an elongation of the front portion of the nawe is opposed to the manifestation of the method.

The Armenian programme of the church is again marked by some peculiarities; absence of an atrium and almost always of the narthex; annexation of a sanctuary to the apse; opening of entrances and often with projecting porches on the longer sides -- two practices familiar to southern Syria; [1] hollowing out small external apses, symmetrical with the internal

ones, in the T-shaped masses at the rear end of the edifice ;[2] the development of a peristyle on the front and side facades of the monument.[3]

Note 1. See page 45.

Note 2. See Churches at Dighour and Usunlar.

Note 3. See Usunlar.

Frequently monumental, the Armenian tomb consisted of a rotunda, an octagon, or again of an area with numerous foils, that was sometimes preceded by a porch.

Chapter 3. Construction.

Armenian architecture is impressive by the quality of its construction.

That was substantially in stone. [1] The jointing was careful and regular, accurately leveled and well pointed.

Note 1. Masonry of mixed bricks and stones was exceptional, as shown by the Church of Koutais (alternating courses and b brick enclosures around the openings).

For covering an opening was sometimes employed a lintel relieved by an arch; but commonly an arch was turned, whose curve was semicircular or stilted in the fashion of Asia Minor.

The pier was preferred to the column, and a portico was composed of arcades. From the 10 th century -- the innovation signifies a revival of Mesopotamian-Persian influence -- those of great span were pointed. (Page 208).

Covering.

The Armenian school realized the covering by means of vaults, very skilfully constructed as tunnel vaults or domes. T The former were strengthened by transverse arches, and were pointed after the 10 th century. The construction of the latter, supported by a cylindrical or polygonal drum, was by superposed annular courses, slightly raised at the outside; their profile was conical in order to avoid complications in c cutting and the erection of centering, as required by the closing of a spheroidal dome (54, 1; 51; 53). The junction of the drum with the supporting square was executed by the expedient of the pendentive in the form of a spherical triangle. The stability was perfect, being ensured by the resistance of four tunnel vaults, whose ends abutted against the great arches supporting the dome, and which covered the adjacent bays of the side aisles, the sanctuary and middle aisle (55).

Armenian construction further attempted a combination of g great ribs and compartment panels, whose realization over the porch-mausoleum at Akhpat (1183)(54, 3,4) presents the twofold interest of a singular analogy to certain parts of the covering of the Mosque of Cordova (page 225), and of an enigmatic resemblance of its principle to that, whose application constitutes the fundamental character of "Gothic"construction. (Volume III).

The roof was of stone and consisted of a covering of slabs in proper form, being in two slopes over the middle aisle and in one over the side aisles; finally as a polygonal pyramid above the dome (51; 55).

Chapter 4. Effects.

[illegible]

and happy, in good measure. 1

[illegible]

And first, it is striking by the very great care for the ex-

[illegible]

ies. It is further remarkable for a total indifference to t the impression produced by material greatness; most of the e edifices are quite small, and the greatest dimension of the more important does not attain 110 ft. 2

[illegible]

Church of Etchmiadzin respectively do not exceed 108.3 and 95.2

[illegible]

are 103.0 and 65.8 ft.

Effects of Monumental Relief.

A characteristic no less marked is a passion for the pictu-resque in monumental taste, that is equally revealed by the

[illegible]

reliefs of the details and the style of the ornamentation.

The entirety is detailed and is distinctly slender; from a lower mass placed on a substructure, itself sometimes raised on a stepped platform, emerge four high aisles with sharp rid-ges; these radiate in cross form from a central cube, from w which rises an elevated cylinder culminating in a pointed co-ne. Frequently the projections of the lateral porches and sometimes the projections of an elevation on a many lobed pl-an add to the animation of the outline (51; 56; 57).

On the other hand, the separate reliefs of the masses mult-ily the variations in the form of strong cornices; the accen-

[illegible]

ire height of the wall (56, 1,3; 57), and internally form a wainscoting on the lower part of the surface (55); the tall and narrow niches made singular by the V form of their horiz-ontal sections (51; 52, 3,6; 53; 56, 3); the narrow windows

[illegible]

91 Chapter 4. Effect.

Besides constituting an essential element of the school, t the Armenian conception of architectural effect is original and happy, in good measure. 1

Note 1. What has been said of the singular resemblance of the Armenian formula of the 10 th, 11 th and 12 th centuries to the "Romanesque" of the West is especially verified, when the comparison of the two schools relates to the effect.

And first, it is striking by the very great care for the external appearance, which differentiates from oriental esthetics. It is further remarkable for a total indifference to t the impression produced by material greatness; most of the e edifices are quite small, and the greatest dimension of the more important does not attain 115 ft. 2

Note 2. The greatest length and width of the Patriarchal Church of Etchmiazin respectively do not exceed 108.3 and 95.2 ft.; for the cathedral of Ani, the corresponding dimensions are 105.0 and 65.6 ft.

Effects of Monumental Relief.

A characteristic no less marked is a passion for the picturesque in monumental taste, that is equally revealed by the general shape of the buildings, their secondary modeling, the reliefs of the details and the style of the ornamentation.

The entirety is detailed and is distinctly slender; from a lower mass placed on a substructure, itself sometimes raised on a stepped platform, emerge four high aisles with sharp ridges; these radiate in cross form from a central cube, from w which rises an elevated cylinder culminating in a pointed cone. Frequently the projections of the lateral porches and sometimes the projections of an elevation on a many lobed plan add to the animation of the outline (51; 55; 57).

92 On the other hand, the separate reliefs of the masses multiply the variations in the form of strong cornices; the accented friezes, of flat arcades, that externally extend the entire height of the wall (56, 1,3; 57), and internally form a wainscoting on the lower part of the surface (53); the tall aud narrow niches made singular by the V form of their horizontal sections (51; 52, 3,6; 53; 56, 3); the narrow windows with wide and projecting architraves; the monumental portals with rich enclosures and external splays; the round windows

(56, 1), and the sloping roofs.

Likewise for the modeling of details, it is diversified and vivid. Instead of pilasters are slender twin columns (56, 1, 2); a clustered form of pier, being a group of engaged supports, of the arch in distinct ribs (58, 4; 53); a mode of detaching the impost of the arch by arranging for it the support of a half column (58, 4; 53); a firm and contrasting profile of the mouldings (59); sometimes a festoon of orders; finally a complex jointing of the column (58), producing twisted shafts and Composite capitals, above which is a series of bulbs, collars, toruses and fringes, an impost in form of a cube covered by flat sculpture, or a bell variously and curiously wrought.

Effects of Ornamentation.

The sculptured ornamentation is attractive. Abundant and thick, executed in very low relief, but deeply sunken and consequently rich in contrasts of light and shadow (61), it is more effective because concentrated in certain places -- the fronts of gables and of apses, high and low friezes, enclosures of doors and windows -- and particularly when it is out of scale (60).

Its inspiration is essentially conventional. Rere are borrowings from plant and animal nature, being moreover greatly conventionalized, and still more the image of man, treated w with a rude chisel. [1] Normal, on the contrary, are geometrical forms grouped in symmetrical compositions; scrolls, arabesques, interlacings and frets. But the preferred motives of Armenian art, and eminently characteristic of its style, are imitations of forms suitable for laces; laces, ropes, plaits, twisted fringes, twists, network, fillets, festoons and fringes (61).

Effects of Harmonic Order.

Yet, however strong the taste of Armenian architecture for rich picturesque effects, it did not exclude the love and feeling for those of the harmonic order.

The relief just analyzed satisfies logic and sacrifices itself in large mearure to the principle of order.

Note 1. Note on the walls of the Church of the Monastery of Aktamar scrolls of vine branches and figures of animals a and persons (Adam and Eve).

The exterior of the church announces its internal arrangement (51; 55; 57); likewise the membered forms of the support, in accord with the impost received by it, manifests its structural function (58, 4).

On the other hand, the radiating distribution of the upper mass of the church is remarkably united, while the care for regularity is emphasized, carried even to the worship of symmetry, in the method taken by Armenian architects of the second epoch to assimilate the rear facade of the edifice to the front facade; indeed they enclose the apse and the little apses in a rectangular mass, restricting themselves to suggesting the actual outline by means of two recesses of V section, sunken on each side of the apse (51; 52, 356; 55).

Part II. Secondary Architectural Styles of Christian Western Asia and of Northern Africa.

After the series of the great schools of western Asia, that we have just presented, a systematic history of architecture should group three secondary dependent and eclectic styles:—

[illegible]

Indeed, the two former probes from those of Mesopotamia, Persia and Syria, the latter from those of Syria and Egypt.

Section I. Arab Architecture before Mohammed.

The southeast of Arabia (Arabia Felix, Yemen); the west and [illegible] Canaan, the isthmus of Suez, the Red Sea (gulf of Akaba) and the Dead Sea; the plains and the desert inserted between Syria, Mesopotamia and Asia Minor, were the scene of an Arab civilization [illegible]

[illegible]

Requirements. — Monumental Chronology and Topography.

In antiquity, Yemen was celebrated for the wealth and luxury of its sovereigns and of its aristocracy, as well as for [illegible]

[illegible]

[illegible] (in the Congr. [illegible] of Nubia, I, 189).

[illegible]

[illegible] in the 1st century B.C., the Nabatean Arabs, who also dominated central and western Arabia, formed a powerful [illegible] Enriched by an active commerce in transit between [illegible] they loved to build, as proved by the magnificent tombs sculpted by them, particularly near Petra, their capital. (Volume I, page [illegible]). At the beginning of the middle ages, they erected on the plateau southwest of the Dead Sea strong citi- [illegible]

About the beginning of our era, the northern Hauran and the

97 Part II. Secondary Architectural Styles of Christian Western Asia and of Northern Africa.

After the series of the great schools of western Asia, that we have just presented, a systematic history of architecture should group three secondary dependent and eclectic styles:-- Premohammedan-Arabian, Coptic-Egyptian and Christian-African. Indeed, the two former proceed from those of Mesopotamia, Persia and Syria, the latter from those of Syria and Egypt.

Section I. Arab Architecture before Mohammed.

The southeast of Arabia (Arabia Felix, Yemen); the west and the centre of the peninsual; the country between the Mediterranean, the isthmus of Suez, the Red Sea (gulf of Akaba) and the Dead Sea; the plains and the desert inserted between Syria, Mesopotamia and Asia Minor, were the scene of an Arab civilization before Mohammed.

I. Requirements. -- Monumental Chronology and Topography. -- Influences.

Requirements. -- Monumental Chronology and Topography.

In antiquity, Yemen was celebrated for the wealth and luxury of its sovereigns and of its aristocracy, as well as for the monumental splendor of its cities; Saba, Hadramaut, Mareb and Nedjiran. [1]

Note 1. See Strabo, XVI, 4; Pliny the Elder, VI, 32; Diodoros of Sicily, V, 40, 47; Agatharcides (in the Geogr. Minor of Muller, I, 189).

Established from the 4 th century B.C. in the region south of the Dead Sea (Edom and Moab), masters of Damascus and of Coele-Syria in the 1 st century B.C., the Nabatean Arabs, who also dominated central and western Arabia, formed a powerful kingdom, whose independence was destroyed by the Romans in 105 A.D. Enriched by an active commerce in transit between Egypt, the Red Sea, Syria, Mesopotamia and the Persian Gulf, they loved to build, as proved by the magnificent tombs multiplied by them, particularly near Petra, their capital. (Volume I, page 501). At the beginning of the middle ages, they erected on the plateau southwest of the Dead Sea strong cities, provided with churches and cemeteries; such were Kornib, Abde, and Es Sbeita.

About the beginning of our era, the northern Hauran and the

region of Damascus were occupied by Sabean Arabs, who in the end embraced Christianity. In the decline of the 5 th century, they were reinforced by a new stream of immigrants -- Ghafnides and Rassanides -- likewise natives from Yemen, and w who also became Christians. Their princes were taken from t the family of Ghassanides, and derived important revenues from policing the desert, which they did on account of the caravans traveling from Damascus to the Red Sea and from Syria into Mesopotamia. They built monuments -- Gate of Honor of Rabbat Ammon; churches, monasteries, and particularly castles for guarding strategic positions and points on the water; we cite those of Kasr-el-Abyad (Kharbet-el-Beida), En Nemara, K Kasr Amman, Maschita, Al Muwaquar, Kharani and Tuba.

Finally on the frontiers of Babylonia in the 3 rd century A.D. was founded an Arab state, whose fortunes were brilliant from the 4 th century until the epoch of the Mohammedan conquest (635); that of the Lakhmides princes, vassals of Sassanian Persia. Their capital was Hira -- south of and near Koufa, southeast of Mesched Ali (Nedjef) -- in a fertile country, whose capicity for productiveness was then greater than now, by reason of a better irrigation, and which formed one stop in the transit between the Persian Gulf, upper Mesopotamia a and Syria. Besides, the Lakhmides dominated the plains and the desert as far as to the Syrian border.

Rimh from the revenues produced by their domains, royalties frsm caravans, tributes from the nomads, they were ostentatious and refined sovereigns, celebrated by Arab poets. Besides Hira, that Noman I (403-418) made an important city, they had to build strong castles to guard the caravan routes; -- Al Khawarnaq near Nedjef; Sedir (at the beginning of the 5 th century); Qual'at Sham'oun in the oasis of Shifatyah; Al Okhayder (1 st half of the 6 th century), the last being still well preserved, and perhaps to be identified with the famous Kasr de Sindad mentioned by Arab authors. [1]

Note 1. The Arab poet Montalamnis names ten of these castles. "If thou art master of Sedir, thou hast Bariq, Mobayidh, the Kasr de Sindad, the Nakhl, the Monabbiq, the Ghamr, Al Ahsa, Sa, Daysaq, and the entire country from Quadisyeh as far as Djouf" (i.e. from the Euphrates to the Nabatean country).

According to Massignon, Comptes Rendus de l'Academie des Inscriptions, 1909, page 205. Let us note that Al Okhayder is attributed to Mohammedan art. (See Reuther, Ocheidir, 1912).

Influences.

Considering its special nature and the historical conditions of its development, it was fated that Premohammedan civilization should be dependent and eclectic in remard to architecture.

Essentially military, it must have been impressed by Roman fortifications, revealed to it by the camps posted on the Syrian routes (El Kastal, El Leggun etc.).

In the eastern portion of its area, it was dominated by the Mesopotamian-Persian art of the Sassanian epoch. At the west, at first attracted by the Hellenism radiating from Alexandria,[1] and Antioch, it was later influenced by the Syrian school, itself strongly affected by Sassanian; finally it was three-fourths conquered by the latter (622).

Note 1. See the fanciful elevations of the facades of Nabatean tombs and of unread architecture exhibited by Pompeian mural paintings of Alexandrine inspiration. See Volume I, F Figs. 335, 350.

II. Programmes and their Realizations.

Without mentioning the churches of the country of Edom, which were designed in the fashion of Syria, what we know of t the productions of Premohammedan Arab architecture is reduced to strong castles and a gate of honor.

The pragsamme of the former was directly inspired by that of the Roman camps (63). It required the enclosure of an area, almost always square and rarely rectangular, by a wall flanked by towers, whose height might attain about 65.6 ft.[2] with battlements, archers' slots, and sometimes a covered passage and a guard room over the gates. These were in number, sometimes one (63, 5,6), sometimes two (63, 4), sometimes being four in the Roman manner, at the ends of the axes (63,2), were not always the object of a special defense; always being freely opposed to the assailants the obstacle of a long and narrow passage, or of an enclosed court (63, 4,5,7).

Note 2. See Okhayder.

The lodgings of the officers, barracks, stables and store--

[illegible] and half-glazed tub in lacing with square or of so a more circle. It was the rule to [illegible] [illegible] and lavatories.

[illegible] of Tosa was of an irregular rectangular measure 8[illegible], 31) [illegible] 3[illegible] ft. on a side. On the contrary, for those of Kusaoi, the corresponding size does not exceed 10[illegible] ft.

If it was necessary to [illegible] the enclosure of a prince, the [illegible] enclosed a[illegible]. Just of the Palace of Yasonika was arranged at the rear of the enclosure and opposite the entrance. Moreover, it consisted of a great vestibule (65, 7), [illegible]) and a throne hall (5); the former being in the form of a [illegible] square and separated from them by partitions; the second was composed of a square area, from which projected in three [illegible] [illegible]

*Note 1. In [illegible], element exactly the composition of the Ba-[illegible] [illegible] [illegible] [

houses were built against the enclosing wall around one or m more courts. It was the rule to establish baths and latrines.

The dimensions were frequently imposing; the ruins of Maschita, of Tuba and of Al Oknayder respectively measure 500, 510 and 558 ft. on a side. On the contrary, for those of Kharani, the corresponding side does not exceed 105 ft.

If it was necessary to foresee the sojourn of a prince, the plan comprised a divan. That of the Palace of Maschita was arranged at the rear of the enclosure and opposite the entrance. Monumental, it consisted of a a great vestibule (63, 7), (7) and a throne hall (8); the former being in the form of a basilica, with three aisles, the middle one wider than the side aisles and separated from them by porticos; the second was composed of a square area, from which projected in cross form three semicircular apses. [1]

Note 1. In brief, almost exactly the composition of the Basilica of the Nativity of Bethlehem. See page 44 and (25). For the plan with three apses, see page 29.

The gate of honor visible in the Citadel of Amman (63, 3; 64) was a rectangular mass pierced by two openings on the same axis; they gave access to a court likewise square, and extended at each side by a wide apse curved beneath a half dome.[3]

Note 2. See plan (63, 3).

Note 3. This is the arrangement of the court of the liwans of Persian mosques. See page 215 and Fig. 137.

III. Construction.

In a general manner the Premohammedan Arab monuments are w well constructed.

It is exceptional for their construction to be entirely in stone; [4] At the east on the frontiers of Mesopotamia, it is entirely of bricks of good manufacture; at the west, it associates bricks and stone, the former being employed for the enclosing walls, for the substructures, the jambs and isolated supports; the latter for the walls and the vaults. [1.]

Note 4. See the propyleum of Amman, erected in a Roman citadel.

Note 1. See the bricks of Maschita.

The materials are respectively rubble, well cut and about 15.7 ins. high, and clay squares measuring sometimes 18.1 ins.

to a mile and 24 inches thick, and consumes using 5.5 inch, 3 square and 2.5 inch. thick.[3]

Note 3. See the Dwelle of the Castle of Tabn.

In one stone masonry of the Palace of Amran is of line exactly, [illegible] [illegible] [illegible]

on a side and 2.9 ins. thick, and sometimes being 9.8 ins. s square and 2.5 ins. thick. [2]

Note 2. See the bricks of the Castle of Tuba.

The cut stone masonry of the propyleum of Amman is of fine quality, in the local Roman tradition. Everywhere else, the procedures are more or less derived from the Mesopotamian-Persian East. The stone wall consists of stone spalls between two facings; jointing with mortar is usual; openings are spanned by an arch with slightly pointed curve, in the Persian f fashion; the portico is an arcade, also pointed, that is supported by constructed piers, rather than by columns. [3]

Note 3. As an example of a portico on columns, see the vestibule of the diwan of Maschita (63, 7 (7)).

The covering is formed by tunnel vaults and domes, built without centering; their profile is sometimes a Sassanian ellipse; [4] ordinarily being a slightly pointed arch. Exceptionally, the half domes of the gate of Amman are of cut stone m masonry in the Syrian style. (Page 54).

Note 4. See the vaults of the Castle of Al-Muwayquar.

The connection of the angles of a square area with a calotte is effected by the Persian artifice of a trumpet.

IV. Effect.

The Premohammedan Arab architecture had an entirely oriental conception of the effect, otherwise dominated in large measure by the limitations of a construction in rubble or in bricks.

Effects of Relief.

The part of the monumental relief is reduced to the modest chances of a part of the high niches crowned by half domes in Mesopotamian taste -- such are seen in the walls of the court of Al-Okhayder -- or of arcades analagous to those of the facade of the Palace of Chosroes at Ctesiphon, and such are shown by the court of the propyleum of Amman (64). [1]

Note 1. The arches exhibit a profile of a stilted arch, w which indicates Mesopotamian-Persian influence (66)(page 12).

The modeling of the details is slight and mediocre. Mouldings are rare and poor, or with a complicated and confused profile. At Amman is observed the series of sawteeth, familiar in brick architecture, and whose execution on a stone mon-

monument presents one of the numerous marks of orientalism o offered by that ruin (66).

The capital is often reduced to a tablet, as if the material were of bricks (66). Otherwise it is treated in the taste of central Syria, frequently cut as a bell with two rows of stiff and dry acanthus leaves, sometimes conformed to the impost and decorated by scholls. [1]

Note 1. See the capitols observed on the ruins of the Castle of Al Muwayquar and curiously ornamented with lily flowers.

Effects of Ornamentation.

On the other hand, ornamentation abounds; ornamental and s significant paintings on plaster; stone facings and mosaics; carefully wrought sculptures, flat but deeply sunken, in the Persian-Syrian taste (page 22), with lights in color and gilding.

The decoration was of the Asian type; continuous, current and covering, producing appearances analogous to those of lace or emproidery, even of a mural fabric. [3] Regular and symmetrical, it formed panels, scrolls and borders (65; 66).

Note 3. On the facade of the Palace of Maschita, a frieze extends to a length of 154.2 ft.

Inspiration could not, so to speak, draw from the spring of plant, animal and human nature. [4] Eclectic, it combined some Hellenizing motives borrowed from Syria -- acanthus and palmatium -- with a majority of oriental elements -- geometrical figures or symbolical images, otherwise over-conventionalized; on the one hand, the zigzag and rosette dear to Mesopotamia and Persia; on the other, the pineapple, likewise a native of Persia, and the vine branch -- or both a Semetic and Persian sign of the idea of life -- and the vase, from which are drinking birsd, animals or men, or from which indeed rises a tree (65; 66).

Note 4. See the exotic animals -- Ox-zebus and lions -- r represented by the sculptures of Kasr-el-Abyod.

Chapter I. Equipments. — Monumental Chronology [illegible]

[illegible]

[illegible] Egypt. While Hellenizing Alexandria became from the end of the 2nd century one of the focuses of Christian theological speculation,[1] the mass of the people, whose mentality remained the same as in the period of the Pharaohs, turned to mysticism, and for the solitudes of the Thebaid and of Nitria, supplied thousands of enthusiasts for the contemplative life, hermits or monks.[2]

Note 1. Alexandria was enlightened by S. Clement of Alexandria (died 217) at the change from the 2nd to the 3rd century [illegible]

[illegible] produced there the Arian heresy.

Note 2. At Oxyrhynchos (Behnesa) in the 5th century were [illegible]

[illegible]

There ensued an important religious demand, that the Arab [illegible] are imperfectly known, because many of the monuments have be- [illegible] ns by the prestige of the antiquities of the Pharaohs. Indeed the interest presented by Coptic art is more historical t [illegible]

Note 3. The caliphs of Cairo were very tolerant.

II. Monumental Chronology and Topography.

In the period of the importance of Coptic architecture, which is limited by the middle of the 4th and the end of the 7th centuries, there may be distinguished two phases.

A primary one corresponds to the second half of the 4th c century and the 5th century, and is recalled by the Sanctuary of S. Menas, which is southeast of Alexandria and groups a great Basilica erected by Arcadius (395-408), a hospital a and various structures,[1] by two Monasteries founded by the Canonical Schenoudi of Atripe on the border of the Libyan de- [illegible] Fischnad) and the White Monastery[2] or of S. Schenoudi (Deir-el-Abiad, Deir Anba Schenoudi); by the Monastery of S. Simeon

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Section II. Architecture of Coptic Egypt.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Influences. -- Radiation.

I. Requirements.

Nowhere was the propagation of Christianity more triumphant than in Egypt. While Hellenizing Alexandria became from the end of the 2 nd century one of the focuses of Christian theological speculation, [1] the mass of the people, whose mentality remained the same as in the period of the Pharaohs, turned to mysticism, and for the solitudes of the Thebaid and of Nitria, supplied thousands of enthusiasts for the contemplative life, hermits or monks. [2]

Note 1. Alexandria was enlightened by S. Clement of Alexandria (died 217) at the change from the 2 nd to the 3 rd century; in the 3 rd by Origen; in the 4 th, the ardor of speculation produced there the Arian heresy.

Note 2. At Oxyrhynchos (Behneso) in the 5 th century were counted 12 churches and still more monasteries; at the same time the diocese contained not less than 20,000 monks.

There ensued an important religious demand, that the Arab conquest (640) reduced without suppressing it. [3] Its results are imperfectly known, because many of the monuments have been destroyed, and attention has been directed from their ruins by the prestige of the antiquities of the Pharaohs. Indeed the interest presented by Coptic art is more historical t than esthetic.

Note 3. The caliphs of Cairo were very tolerant.

II. Monumental Chronology and Topography.

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(Deir Anba Samaan) on the left bank of the Nile opposite Assouan.

Note 1. Place of burial of the saint, the aim of one of the most celebrated pilgrimages at the beginning of the middle ages.

Note 2. So called because of the rare peculiarity of its construction in stone.

A secondary one comprises the 6 th and 7 th centuries and has for evidence; the Monastery of S. Jeremiah at Saccara; t that of Baouit, a little north of Siout; the group of monasteries at Negada, north of Luxor; the principal one being the Monastery of the Angels (Deir-el-Melak) with four adjacent churches; the four monasteries of the valley of Wady Natroun (desert of Nitria), consecrated by S. Macaire (295-390); Deir Abou Makar, Deir Baramous, Deir Anba Bischai (Monastery of S. Isaiah), Deir Souriani (Monastery of the Syrians). From this epoch also dates the foundation of the churches of the old Cairo, erected within the enclosure of the Persian-Roman fortress of Babylon -- Abou Sarga (S. Sergius), El-Moallakha (the Suspended), [1] Mari Girgis (S. George), Sitte Burbara (S. Barbara), El Adra, etc.; but excepting the crypt of the first, their actual state results from restorations and reconstructions.

Note 1. I. e. "on columns".

III. Conditions. -- Influences. -- Radiation.

The development of the Coptic architecture was closely restricted by the nature of the country, for the description of which we refer to Volume I of this work (page 25), and by t the scarcity of workmen long deprived of the opportunity for working.

Its orientation depended in very limited measure on Hellenistic art, of which Alexandria was still the capital, and it was scarcely affected by the Byzantine. On the contrary, it was determined by the persistence of the traditions of the P Pharaohonic period; by an energetic reaction of the national genius against Hellenism; [1] by Coptic mysticism; finally by a strong influence of the Persian-Mesopotamian and Syrian schools. [2]

Note 1. This reaction was favored by the aversion of the Church to pagan civilization. Note the savage destruction of Hellenistic monuments by Theophilus, Patriarch of Alexandria,

by the monk Schenoudi, etc.

Note 2. Persian influence affected construction; Syrian t the decoration.

In its turn, Coptic art radiated in correlation with the e extension of Egyptian monachism, and as regards decoration, with an active exportation of painted or embroidered fabrics, that Egypt manufactured on a great scale. It particularly acted on northern Africa. (Pages 117, 118, 120).

Chapter 2. Programmes and Their Realizations.

The programme of a Coptic church is a variation on the [illegible]

[illegible]

There are universal: the suppression of the atrium, replaced by a narthex with basin for purification (69, 1-3); enlargement of the sanctuary, that is masked by a screen, equivalent to the Byzantine iconostasis (69, 1-12; III, 4); the construction of a choir as a wide transept, closed on the side next the nave by a perforated screen, or even by a masonry panel with doorways (69, 1-11; II, 2,3); opening of lateral entrances (69, 2,3,4).

Others are common, such as the introduction of galleries for separating the sexes, or without these, by dividing the nave by a transverse barrier (69, 1).

Finally, some are more or less frequent; these are a trefoil shape of the sanctuary (69, 2); [4] a repetition of the apse on the front end of the nave (69, 4); [5] a return of the side aisles forming an ambulatory at the front end of the church (69, 3); [1] the addition of lateral chapels (69, 3); [2]

[illegible]

Note 1. Zwei Petr-Ut-Scutiani und Petr-Anba-Fiscini.

[illegible]

[illegible]

or entirely buried in the mountain, like the remiseus or speos of the Pharaohs. (Volume I, page 37).

Even, where in accordance with atmospheric conditions and with Coptic mysticism, lighting is scarce and is sparingly distributed by narrow openings placed in the tops of the walls or in the dome (70).

Chapter 2. Programmes and their Realizations.

The programme of a Coptic church is a variation on the theme of the basilica with three apses; several peculiarities o observed on the monuments listed result from the monastic destination of most.

There are universal, the suppression of the atrium, replaced by a narthex with basin for purification (69, 1-3); enlargement of the sanctuary, that is masked by a screen, equivalent to the Byzantine iconostasis (69, 1-12; III, 4); the construction of a choir as a wide transept, closed on the side next the nave by a perforated screen, or even by a masonry p panel with doorways (69, 1-11; II, 2,3); opening of lateral entrances (69, 2,3,4).

Others are common, such as the introduction of galleries f for separating the sexes, or without these, by dividing the nave by a transverse barrier (69, 1).

Finally, some are more or less frequent; these are a trefoil shape of the sanctuary (69, 2); [4] a repetition of the apse on the front end of the nave (69, 4); [5] a return of the side aisles forming an ambulatory at the front end of the church (69, 3); [1] the addition of lateral chapels (69, 3); [2]

Note 4. See the "White" and "Red" Monasteries near Sohag.

Note 5. See the Church of Erment, measured and drawn by t the scientists of the expedition to Egypt.

Note 1. See Deir-el-Souriani and Deir-Anba-Bischoi.

Note 2. See Deir-Anba-Bischoi.

Also note that in upper Egypt, many sanctuaries are partly or entirely buried in the mountain, like the hemispeos or speos of the Pharaohs. (Volume I, page 57).

Everywhere in accordance with atmospheric conditions and with Coptic mysticism, lighting is scarce and is sparingly d distributed by narrow openings placed in the tops of the walls or in the dome (70).

Chapter 5. Construction.

From the point of view of construction, the Coptic school is inspired by Mesopotamia, Sassanian Persia and Pharaonic Egypt, far more than by Alexandrine Hellenism.

Although it was not prevented from taking shapes from the monuments of the past, it normally built with crude bricks. [illegible] made arcade openings.

[illegible]

From a temple of Pauses [illegible].

When it had no antique columns at command, it freely made the isolated support a pier of square section. At the beginning, it sometimes adopted the Hellenistic system of a portico with architrave; but it soon preferred the arcade, which was at first semicircular or elliptical, but became pointed after the 8 th century.

Having rejected the Hellenistic formula, it realized the covering by means of vaults, erected without centering; it [illegible] over the sanctuary, or -- the practice was late -- it multip- [illegible] at first adopted the Egyptian ellipse (volume I, page 71), a and then from the 8 th century an arch more or less pointed. It connected a small to the angles of the square by the expedient of angle truncets, and emitted it by means of half dom- [illegible] [illegible] a tunnel vault of the middle aisle by two rampant half tunnel vaults over the side aisles, which by a curious analogy was familiar to several schools of the western Romanesque. (Volume III).

Page 2. See the [illegible] Monasteries at Sohag.

[illegible]

Church of Deir-Abu-Kaneta.

[illegible]

[illegible] external surfaces.

Chapter 3. Construction.

From the point of view of construction, the Coptic school is inspired by Mesopotamia, Sassanian Persia and Pharaohonic Egypt, far more than by Alexandrine Hellenism.

Although it was not prevented from taking stones from the monuments of the past, [1] it normally built with crude bricks. It erected walls externally battering in the Pharaohonic mode, and made arched openings.

Note 1. Thus the materials of Deir-el-Abiad were stolen f from a temple of Ramses III.

When it had no antique columns at command, it freely made the isolated support a pier of square section. At the beginning, it sometimes adopted the Hellenistic system of a portico with architrave; but it soon preferred the arcade, which was at first semicircular or elliptical, but became pointed after the 6 th century.

Having rejected the Hellenistic formula, it realized the c covering by means of vaults, erected without centering; it either built tunnel vaults over the aisles and erected a dome over the sanctuary, or -- the practice was late -- it multiplied calottes above the entire edifice. For the profile was at first adopted the Egyptian ellipse (Volume I, page 71), a and then from the 6 th century an arch more or less pointed. It connected a shell to the angles of the square by the expedient of angle trumpets, and abutted it by means of half domes (70). [2] It was acquainted with the practical method of abutting a tunnel vault of the middle aisle by two rampant half tunnel vaults over the side aisles, [3] which by a curious analogy was familiar to several schools of the western Romanesque. (Volume III).

Note 2. See the "White" and "Red" Monasteries at Sohag.

Note 3. Witness the drawings by the scientists of the expedition to Egypt. (Antiq. IV, Pl. 67; the covering of the Church of Deir-Abou-Fanetz).

The roof was formed as a terrace; the domes had nothing but their external surfaces.

Chapter 4. Effect.

I. Effects of Relief.

Coptic architecture was dainty in effect and with a picturesque tone, at least in regard to the internal appearance. For it was entirely indifferent to that of the exterior, making the form of the edifice a truncated rectangular pyramid crowned by an Egyptian cornice (Volume I, page 79).

The arrangement of the interior presents some endeavor for monumental secondary relief, rare and less frequent as the e epoch considered is more recent, otherwise opposed by construction in bricks; animation of the wall by alternation of a niche and a free column; [1] marking its top by a cornice (70); accenting the arches by a moulded archivolt (70); resting their imposts on columns, free and standing before the piers (70); enclosure of a window opening or trumpet of the dome by an arch on small colunms, and a projecting sill (70). [2]

Note 1. See the Monastery of Sohag and that of S. John at Antinoe.

Note 2. As an example, see particularly the "White" Monastery at Sohag.

As for the relief of details, the part therein taken by Coptic architecture was very small and never comprised only miserable results. Frequently a projection scarcely marks the limit between the pier and the arch; sometimes even, the surface was continuous. [3] The Church of Deir Baramous presents an example of modeling of the front surface in the image of a pair of coupled cylinders. The capital of the column exhibited either a coarse imitation of the Corinthian type, a repetition of the Byzantine impost block or a truncated cone, or mediocre forms outlined as a bulb or a bell with foliage.

Note 3. See Church of Deir Sourioni in Nitria.

II. Effects of Ornamentation.

In brief, it is by ornamentation that Coptic architecture satisfied its passion for effect. It required from painting more than from sculpture, not only because constructing in bricks it employed plastering, but also because of a taste f for color, that it had inherited from its Alexandrine and Pharaoahnic ancestors. (Volume I, pages 386, 104).

As for inspiration as well as for style and technics, Coptic

decorative sculpture was derived from that of Syria (page 67), [illegible] arse, it was devoted to floral and geometrical motives (68). More at ease in wood, it produced remarkable woodwork from t the 7 th century [3] and currently in the 11 th and 12 th. [4]

[illegible]

Note 4. See the churches of Cairo.

[illegible] the interiors, painting in motley arrangement and hard harmonies of bright red, emerald green, ochre, violet and white. Facings of marble and mosaics were rare.

[illegible] prine fashion, it soon became historical, devoted to the representation of subjects taken from the Bible. On the whole, the style was conventional, but the faces manifested in a remarkable degree the taste and feeling for portraits (71). [5]

Note 5. See the decorative painting of the Pharaohonic monuments.

[illegible] at surfaces and very rhythmical in the entirety as well as in details, with an extensive conventionalization of the plant model; finally by the preponderance of the geometrical motiv- [illegible] vine and frequently animated by doves or the lion of the Apocalypse, plaits and spirals; interlaced squares, lozenges, o octagons and circles; with crosses scattered in the network. [illegible]

On the whole, an appearance of rude luxury, singular originality, of primitive and rough art.

decorative sculpture was derived from that of Syria (page 67), flat and dry, carved in collars, otherwise often weak and coarse, it was devoted to floral and geometrical motives (68). More at ease in wood, it produced remarkable woodwork from t the 7 th century [3] and currently in the 11 th and 12 th. [4]

Note 3. See Deir Sourian.

Note 4. See the churches of Cairo.

Very superior, and in regard to the restricted lighting of the interiors, painting in motley arrangement and hard harmonies of bright red, emerald green, ochre, violet and white. Facings of marble and mosaics were rare.

Although essentially ornamental, its repertory comprised a mode of significant illustration, elsewhere confined to the sanctuary. At first picturesque and decorative in the Alexandrine fashion, it soon became historical, devoted to the representation of subjects taken from the Bible. On the whole, the style was conventional, but the faces manifested in a remarkable degree the taste and feeling for portraits (71). [5]

Note 5. See the decorative painting of the Pharaohonic monuments.

Painted or sculptured, the ornamental decoration was characterized by the continuity of compositions extending over great surfaces and very rhythmical in the entirety as well as in details, with an extensive conventionalization of the plant model; finally by the preponderance of the geometrical motives; these were leaf or flower arabesques, dominated by the v vine and frequently animated by doves or the lion of the Apocalypse, plaits and spirals; interlaced squares, lozenges, o octagons and circles; with crosses scattered in the network. (68; 71; 72).

On the whole, an appearance of rude luxury, singular originality, of primitive and rough art.

[illegible]

Chapter I. Requirements. -- Monumental Chronology and Topography. -- Influences.

I. Requirements.

The Christianity of Africa was a model of fervor, a nursery of martyrs, doctors and monks.[1] On the other hand, in the n number of cities, the Donatist heresy doubled the need of religious edifices. Thus in the course of the 4 th and 5 th c [illegible] native chapels and of monasteries. Opposed by the first invasions of the Vandals from 477 to 533, and by the persecutions directed against the Catholics by the Arian Huneric and n his successors on the Vandal throne, the demand increased at the accession of Hilderic, who restored toleration; after 534 and especially in Tunisia, it was favored by Byzantine domination, which also involved numerous works in fortification. But it was suppressed at the end of the 7 th century by the Mohammedan conquest (698-709).

[illegible] *ue and S. Augustine. In the decline of the 4 th century, S. Augustine brought to Italy the rules of the monastic life, m which rapidly acquired numerous disciples.*

II. Monumental Chronology and Topography.

[illegible] tian architecture of Africa lacked much of corresponding to [illegible] to the level of the ground.

[illegible] to accurately fix their dates.

To limit ourselves to ruins of some importance, we cite the [illegible] thage (Basilica of Damous-el-Karita); of Castiglione; of Dermech; of Dar-el-Kous (Kof); of Henchir-el-Atech, between Satif and Batna; of Henchir-Saadin; of Kherbet-bou-Addoufen, n [illegible] ies); of Morsott, north of Tebessa; of Orleansville (524, restored in 475); of Siagu; the considerable entirety of the

116 Section III. Christian Architecture of Africa.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Influences.

I. Requirements.

The Chrirtianity of Africa was a model of fervor, a nursery of martyrs, doctors and monks. [1] On the other hand, in the n number of cities, the Donatist heresy doubled the need of religious edifices. Thus in the course of the 4 th and 5 th c centuries, there was a swarm of ritual churches, of commemmotative chapels and of monasteries. Opposed by the first invasions of the Vandals from 477 to 528, and by the persecutions directed against the Catholics by the Arian Huneric and h his successors on the Vandal throne, the demand increased at the accession of Hilderic, who restored toleration; after 534 and especially in Tunisia, it was favored by Byzantine domination, which also involved numerous works in fortification. But it was suppressed at the end of the 7 th century by the Mohammedan conquest (698-708).

Note 1. See Tertullian, S. Cyprian, S. Optat, S. Fulgentius and S. Augustine. In the decline of the 4 th century, S. Augustine brought to Italy the rules of the monastic life, w which rapidly acquired numerous disciples.

II. Monumental Chronology and Topography.

Unfortunately, the quality of the producition of the Christian architecture of Africa lacked much of corresponding to their quantity, and they have been almost entirely destroyed to the lewel of the ground.

117 Most of the monuments may be dated from the 4 th century a and the first two-thirds of the 5 th, without its being possible to accurately fix their dates.

To limit ourselves to ruins of some importance, we cite the Churches of Announa (Thibilis), of Benian (about 435); of Carthage (Basilica of Damous-el-Karita); of Castiglione; of Dermech; of Dar-el-Kous (Kef); of Henchir-el-Atech, between Satif and Batna; of Henchir-Msaadin; of Kherbet-bou-Addoufen, n near Setif; of Kherbet Guidra, northeast of Setif (first half of 5 th century); of Matifou, near Algiers (4 th and 6 th centuries); of Morsott, north of Tebessa; of Orleansville (324, restored in 475); of Siagu; the considerable entirety of the

Basilica of Tebessa and of its ritual and monastic additions (4th-5 th centuries); the Churches of Thabarca (5 th century); the great Basilica of Tigzirt (middle of 5 th century); the ruins of a monastery at Timgad; the Basilica of S. Salsa at Tipasa, near Cherchell (4 th and 6 th centuries); the Church of Upenna. As examples of fortifications may be cited those of Bagai, of Tebessa, of Bordj-Hallal, of Haidra, of Thalapt.

III. Influences.

In spite of the proximity of Italy and the relations of the African Church with Rome, the architecture of Africa shows itself entirely independent of the "Latin". (Volume III). On the other hand, it is connected with the schools of Syria and of Egypt.

The processes of the African Church is that of the Cornel [illegible], orientated to the East. The nave was commonly divided into three aisles, the middle one being wider and [illegible] than the others. But there exist several examples of a [illegible] (74, [illegible]) [illegible] at Tigzirt; 7 at Matifou and at Tipasa; 9 at Tipasa ([illegible] state), at Dumous-el-Karita of Carthage); this appears to have been determined by the desire to relieve the carpentry of the covering.

Note 1. In several edifices (Tipasa, Matifou etc.), an in- [illegible]

Galleries are exceptional,[2] and the known examples are of the late epoch (76, 1).

[illegible]

The apse was regularly elevated -- often about 0.8 ft. -- and was accessible by steps arranged at the ends of its front (74, 7; 75), ordinarily terminating in a semicircle;[3] but it was often -- in the Syrian fashion -- externally enclosed in a rectangular mass (74, 1), or even entirely concealed by the rectangular form of the rear of the edifice (74, 8,6,7). In the oriental fashion, it was generally flanked by a chapel and a sacristy, both of rectangular plan (74, 8,5,7). Very frequently the altar occupied in the nave the centre of the enclosure by a chancel (74, 8,5,7); at other times it was placed at the border between the apse and the nave (74, 1). Several sanctuaries are known, beneath which were constructed crypts (74, 7).[4] Some Churches -- Orleansville and Matifou -- have an opposite western apse, added to the edifice with the purpose of a tomb (74, 6).[5] Lighting was ensured by openings cleared in the upper zone of the walls of the great aisle and in those of the side aisles. The facade of the Church of Anthony exhibits windows opened at each side of the doorway, that produces an arrangement-concrete-distic of the art of northern central Syria (76, 2).

[illegible]

Note 2. See the Churches of Bouton and of Coatigliano.

118 Chapter 2. Programmes and their Realizations.

The programme of the African church is that of the normal basilica, orientated to the East. The nave was commonly divided into three aisles, the middle one being wider and higher than the others. But there exist several examples of a more subdivided distribution (74, 6) (5 aisles at Orleansville and at Tigzirt; 7 at Matifou and at Tipasa; 9 at Tipasa ((second state), at Damous-el-Karita of Carthage); this appears to have been determined by the desire to relieve the carpentry of the covering. [1]

Note 1. In several edifices (Tipasa, Matifou etc.), an increase in the number of aisles occurred after their erection.

Galleries are exceptional, [2] and the known examples are of the late epoch (76, 1).

Note 2. As an example may be cited that of the Church at Tigzirt.

The apse was regularly elevated -- often about 3.3 ft. -- and was accessible by steps arranged at the ends of its front (74, 7; 75), ordinarily terminating in a semicircle; [3] but it was often -- in the Syrian fashion -- externally enclosed in a rectangular mass (74, 1), or even entirely concealed by the rectangular form of the rear of the edifice (74, 3,6,7). In the oriental fashion, it was generally flanked by a chapel and a sacristy, both of rectangular plan (74, 3,5,7). Very frequently the altar occupied in the nave the centre of the enclosure by a chancel (74, 3,5,7); at other times it was placed at the border between the apse and the nave (74, 1). S Several sanctuaries are known, beneath which were constructed crypts (74, 7). [4] Some Churches -- Orleansville and Matifou -- have an opposite western apse, added to the edifice with the purpose of a tomb (74, 6). [5] Lighting was ensured by openings pearced in the upper zone of the walls of the great aisle and in those of the side aisles. The facade of the Church of Announa exhibits windows opened at each side of the doorway, that produces an arrangement characteristic of the art of northern central Syria (76, 3).

Note 3. At Tebessa (76), the apse is single and in horseshoe form.

Note 4. See the Churches of Benian and of Castiglione.

Note 3. See examples of the same procedure in Egypt, pp.[illegible].

Almost always -- a peculiarity indicating Syrian influence -- the shrine is wanting;[1] it was replaced by a vestibule, sometimes based as a portico (VA, 5), more frequently enclosed (VA, n,10-12), occasionally between two towers,[2] as in Syria; sometimes even, there was no entrance in the facade.

(VA, 5).

Note 4. See the plans of Amarna.

The trefoil plan was freely adopted for funerary chapels; earlier to Egypt and Syria (VA, n,5);[1] the Sanctuary of T (VA, 4).

Note 1. See Ruelle of Tebaan (annexed chapel); that of

Note 5. See examples of the same procedure in Egypt, page109.

119 Almost always -- a peculiarity indicating Syrian influence -- the atrium is wanting; [1] it was replaced by a vestibule, sometimes opened as a portico (74, 9), more frequently enclosed (74, 8,10-13), occasionally between two towers, [2] as in Syria; 120 doorways were freely opened in the longer sides of the church; sometimes even, there was no entrance in the facade.

Note 1. As an exception, we cite the Basilica of Tebessa (142, 3).

Note 2. See the Church of Morsott.

The trefoil plan was freely adopted for funerary churches, familiar to Egypt and Syria (74, 2,3); [1] the Baptistery of T Tigzirt presents a specimen of a radiating quatrefoil outline. (74, 4).

Note 1. See Basilica of Tebessa (annexed chapel); that of Kherbet-bou-Addoufen; that of Damous-el-Karita at Carthage.

Part 2. Construction.

In a general way, the Gothic church or Byzan coils very early. Wide ribs come very rare exceptions.[2] It never exp- lopel out stone, but a sort of framework of stones was common for ordinary churches after the Roman epoch (Volume I, page

one constone blocks at intervals of 2.5 to 6.5 ft. Openings

consisted of a stone cribbed out cement, as in that country.

Note 2. See Structure of Tracery (77). Height and Length.

The lozenge support was sometimes treated as a column -- about always borrowed from an antique edifice; sometimes as a built rectangular pier; occasionally as a pair of twin col- umns set transversely to the axis of the nave.[3] The portico was an arcade of semicircular arches (76, 76, 1; 77, 1).

Knocking spans and narrow aisles, the first cause vaulted c. built across the second by cross vaults, the covering w was consequence of wood. In Spirite familiar to northern S

supports of the portico, reduced the spans of the beams (76; 77, 1).[3]

Note 3. See Tracery and Height.

Chapter 3. Construction.

In a general way, the Christian school of Africa built very badly. Aside from some very rare exceptions, [2] it never emp-
12/ loyed cut stone, but a sort of framework of stones was common for ordinary structures after the Roman epoch (Volume I, page 479); this was a rubble about 1.6 ft. thick, strengthened by the cutstone blocks at intervals of 2.6 to 6.6 ft. Openings were spanned by lintels relieved by arches, leaving the tympanum open in the Syrian fashion (76, 3), and which sometimes consisted of a stone hollowed out beneath, as in that country.

Note 2. See Churches of Tebessa (75), Tigzirt and Timgad.

The isolated support was sometimes treated as a column -- almost always borrowed from an antique edifice; sometimes as a built rectangular pier; occasionally as a pair of twin columns set transversely to the axis of the nave. [2] The portico was an arcade of semicircular arches (75, 76, 1; 77, 1).

Excepting apses and narrow aisles, the first being vaulted by half domes and the second by cross vaults, the covering w was constructed of wood. An artifice familiar to northern S Syria -- the erection of two columns superposed before the supports of the portico, reduced the spans of the beams (75; 77, 1). [3]

Note 3. See Tebessa and Tigzirt.

Chapter 5. Effect.

Considered with regard to the effect, the religious monume-
[illegible]
[illegible]; the best rise but little above mediocrity.[4]

Note 2. The only remarkable monument is the Basilica of Te-
[illegible]

Their dimensions were small,[1] and their sculpture was rud-
imentary.[2] When not second hand, capitals and bases were sim-
[illegible]
ularly of the Ionic and Tuscan (77).

Note 1. Great Basilica of Tipasa, 171 × 148 ft.; Basilica of Tebessa, 151 × 72 ft., for important edifices, a length of 82 to 112 ft. is quite common.

[illegible]
Khous) of the animation of a wall of an apse by means of small free columns, also notable at Tebessa (75), Tigzirt and Tipasa, a method of resting the triumphal arch of the apse on columns set before the piers.

The sculptured ornamentation was rare, flat, heavy and coarse. They made up for it by painting and particularly by mosaics, covering pavements and mural facings.[1]

[illegible]
silicas of Tebessa, Timgaso and Tigzirt (76, 77, 78).

The ordinary motives were very simple geometrical ornaments
[illegible]
the Syrian taste (78) and symbolical figures -- monogram of Christ, dove holding olive branch, mystical lamb, vine branch, vase of life of man, in which grows a vine with peacocks facing it.

Chapter 4. Effect.

Considered with regard to the effect, the religious monuments of Christian Africa reveal themselves as entirely insuff-
/22 icient; the best rise but little above mediocrity. [4]

Note 4. The only remarkable monument is the Basilica of Tebessa, whose composition is picturesque and monumental.

Their dimensions were small, [1] and their sculpture was rudimentary. [2] When not second hand, capitals and bases were sim-
/23 plifications, even caricatures of Greco-Roman orders, particularly of the Ionic and Tuscan (77).

Note 1. Great Basilica of Tipasa, 171 × 148 ft.; Basilica of Tebessa, 151 × 72 ft.; for important edifices, a length of 82 to 112 ft. is quite common.

Note 2. We cite some rare examples (at Matifou and Dar-el-Khous) of the animation of a wall of an apse by means of small free columns, also notable at Tebessa (75), Tigzirt and Tipasa, a method of resting the triumphal arch of the apse on columns set before the piers.

The sculptured ornamentation was rare, flat, heavy and coarse. They made up for it by painting and particularly by mosaics, covering pavements and mural facings. [1]

Note 1. See the relatively luxurious decoration of the Basilicas of Tebessa, Thabasca and Tigzirt (76, 1; 78).

The ordinary motives were very simple geometrical ornaments -- cables, plaits, guilloches and beads -- often entirely in the Syrian taste (78) and symbolical figures -- monogram of Christ, dove holding olive branch, mystical lamb, vine branch, vase of life of man, in which grows a vine with peacocks facing it.

After an interval of a thousand years, the Egean region renewed under analogous conditions the work of combination and of selection, which it had accomplished with so much success in Hellenic times. Like the Grecian, Byzantine architecture [illegible] western Asia Minor, Greece, the Archipelago and Macedon, with constantinople as their centre; like it again, it radiated over the riverside connections of the eastern Mediterranean; and finally like it, it composed a formula of conclusion and [illegible] activity, a compromise between the esthetic ideals of the East and the West, but this time to the advantage of the for-[illegible]

In the career of eleven centuries (from the 4 th to the 1[illegible] [illegible] of the 12 th centuries), separated by a period of depression (7 th and 8 th centuries; first and second thirds of the 9 th), and to reveal by a period of decline, terminated by the Turkish conquest in the middle of the 15 th century.

Note 1. The study of Byzantine architecture is opposed by the destruction of numerous monuments; by the uncertainty in [illegible] edifices, by the disfiguration resulting from their appropri-[illegible]

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Apochs. -- Schools.

[illegible] the services of architecture, Byzantine civilization realized [illegible] perfecting of the art of building. For the multitude of undertakings, largely ordered in general, that it proposed, compr-[illegible] as well as of utility, official as well as private. On the one hand, public and civic works of utility or estent-[illegible]

124 Part III. Third Epoch of Egean Architecture.

Section sole. Byzantine Architecture.

After an interval of a thousand years, the Egean region renewed under analagous conditions the work of combination and of selection, which it had accomplished with so much success in Hellenic times. Like the Grecian, Byzantine architecture had for its proper area the countries around the Egean Sea-western Asia Minor, Greece, the Archipelago and Macedon, with constantinople as their centre; like it again, it radiated o over the riverside connections of the eastern Mediterranean; and finally like it, it composed a formula of conclusion and compromise:-- termination of the architectural researches of antiquity; a compromise between the esthetic ideals of the E East and the West, but this time to the advantage of the former.

In the career of eleven centuries (from the 4 th to the 15th th) supplied by Byzantine architecture may be distinguished two phases of prosperity and impetus (4 th, 5 th and 6 th centuries -- last third of 9 th, the 10 th, 11 th, and first half of the 12 th centuries), separated by a period of depression (7 th and 8 th centuries; first and second thirds of the 9 th), and followed by a period of decline, terminated by the Turkish conquest in the middle of the 15 th century. [1]

Note 1. The study of Byzantine architecture is opposed by the destruction of numerous monuments; by the uncertainty in date of many of those remaining; finally, for many religious edifices, by the disfiguration resulting from their appropriation to Mohammedan worship.

125 Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Epochs. -- Schools.

I. Requirements.

By the number, importance and diversity of its appeals for the services of architecture, Byzantine civilization realized indeed more than necessary, the primary condition for the fl-
126 ourishing of the art of building. For the multitude of undertakings, largely endowed in general, that it proposed, comprising those of secular as well as of religious purcoses, of luxury as well as of utility, official as well as private. On the one hand, public and civic works of utility or ostentation,

fortifications, both frandly conceived; on the other being t the realization of comfortable dwellings, suited for a numerous and wealthy citizen class, sumptuous mansions for a rich aristocracy, passionately fond of splendor, marvellous palaces for the emperors with the means and the desire to dazzle and to astonish;[1] finally as a result of the fervor and devotion tinged with superstition and confined to ritual practi- [illegible] and magnificent, and of vast monasteries, complex groups of [illegible] tals and schools.

Note 1. The imperial revenue in the time of the Macedonian dynasty is estimated at about $600,000,000. At the death of Basil II (1025), the treasury contained a reserve of $200,000,000.

[illegible]

1. From the 4 th to the middle of the 9 th century.

When the West was weakened by anarchy and invasion, vegeta- [illegible] joyed peace and was enriched by an intense industrial and commercial activity, remaining faithful to the tradition of Hellenistic and Roman luxury.

[illegible] transfer of the seat of the empire to Byzantium. Promoted to the dignity of a capital, of a "second Rome", that provincial city of the second order became a feverish building area under the energetic impulse of Constantine, maintained by his successors in the course of the 4 th century. The productions consisted of aqueducts, sewers, colossal cisterns, forums surrounded by porticos -; Forum of Constantine, Forum of Tauros, and the Augusteion; of streets with colonnades, such as the grand central Avenue (Mesea); of baths -; of Zeuxippos, [illegible] th 19 couches) etc., Palace of the Senate, Treasury, Prefect-

fortifications, both grandly conceived; on the other being t the realization of comfortable dwellings, suited for a numerous and wealthy citizen class, sumptuous mansions for a rich aristocracy, passionately fond of splendor, marvellous palaces for the emperors with the means and the desire to dazzle and to astonish; [1] finally as a result of the fervor and devotion tinged with superstition and confined to ritual practices, the erection of churches by hundreds, often monumental and magnificent, and of vast monasteries, complex groups of sanctuaries, chapels, monastic buildings, shops, inns, hospitals and schools.

Note 1. The imperial revenue in the time of the Macedonian dynasty is estimated at about $600,000,000. At the death of Basil II (1025), the treasury contained a reserve of $200,000,000.

II. Monumental Chronology and Topography.

1. From the 4 th to the middle of the 9 th century.

When the West was weakened by anarchy and invasion, vegetating in misery and infected by barbarism, the Egean region enjoyed peace and was enriched by an intense industrial and commercial activity, remaining faithful to the tradition of Hellenistic and Roman luxury.

To the general course of the demand produced by the triumph of Christianity was added after 327, that originated by the transfer of the seat of the empire to Byzantium. Promoted to the dignity of a capital, of a "second Rome", that provincial city of the second order became a feverish building area under the energetic impulse of Constantine, maintained by his successors in the course of the 4 th century. The productions consisted of aqueducts, sewers, colossal cisterns, forums surrounded by porticos -: Forum of Constantine, Forum of Tauros, and the Augusteion; of streets with colonnades, such as the grand central Avenue (Mesea); of baths -:; of Zeuzippos, Achilleos, of Eudoxia and of Arcadius; of circuses, like the famous Hippodrome with its grand imperial gallery (Kathisma); of official structures -- the Sacred Palace for the sovereign, with vestibule (Chalce), residence (Daphne), throne hall(Augusceus, consistorium, Magnaura), banquet hall (Triclinios with 19 couches) etc., Palace of the Senate, Treasury, Prefect-

[illegible]

[illegible]

[illegible]

ch are distinguished the churches dedicated by Constantine to the Divine Wisdom (S. Sophia) and to S. Irene, and the Martyrs' Church consecrated to the memory of the S. Apostles.[1]

[illegible]

churches !

From this great undertaking remains only the memory. Indeed the haste of the work condemned to premature ruin edifices, which besides were merely the current productions of the Hellenistic-Roman art in its decline.

For the work of the 5 th century, we possess monumental documents. If constantinople can no longer prize itself on the magnificence of the Golden Gate, that Theodosius II (408-450) erected about 447, it retains portions of the walls by which that prince enclosed it, and vestiges of the fortified Palace [illegible]

[illegible]

the beginning of the century the Church of S. George; and to[illegible]

ary of unknown Christian name, of which Islam has made the [illegible]

[illegible]

ions demands of Asia Minor during those two centuries is att[illegible]

[illegible]

nge from the 5 th to the 6 th century, Byzantine architecture [illegible]

(Pages 148, 160). Toward the end of the first third of the [illegible]

Prefecture of the city; of commemmorative monuments -- Triumphal Arches of Constantine and of Theodosius, Columns of Theodosius and of Arcadius; finally, the sanctuaries, among which are distinguished the churches dedicated by Constantine to the Divine Wisdom (S. Sophia) and to S. Irene, and the Martyrs' Church consecrated to the memory of the S. Apostles. [1]

Note 1. In Constantinople alone, Constantine erected 21 c churches !

From this great undertaking remains only the memory. Indeed the haste of the work condemned to premature ruin edifices, which besides were merely the current productions of the Hellenistic-Roman art in its decline.

For the work of the 5 th century, we possess monumental documents. If constantinople can no longer pride itself on the magnificence of the Golden Gate, that Theodosius II (408-450) erected about 447, it retains portions of the walls by which that prince enclosed it, and vestiges of the fortified Palace of Boucoleon. From the year 463 has endured the Church of S. John Stoudion (Emir Achor Djami Mosque).

At Thessalonica (Salonica), where the art benefited from t the concurrence of the rare economical prosperity, brilliant civilization and great intellectual activity, were erected at the beginning of the century the Church of S. George, and toward the middle, that of S. Demetrios, as well as the Sanctuary of unknown Christian name, of which Islam has made the Mosque of Eski Djouma.

On the other hand, the reality and importance of the religious demands of Asia Minor during those two centuries is attested by the Church of the Trinity at Ephesus, by S. John and S. George of Sardes, by the Basilicas of Philadelphia (Ala S Shehr), of Pergamon and of Hierapolis, etc.

The Church of S. Sophia at Salonica shows, that at the change from the 5 th to the 6 th century, Byzantine architecture attempted great innovations with very important consequences. (Pages 148, 160). Toward the end of the first third of the 6 th century, its progress resulted in a splendid undertaking, an imposing manifestation of maturity and temperament, on the one hand favored by the fever for building aroused in Justinian (527-565) by pride, by interested devotion, and also by

an elevated conception of his imperial role; on the other, t
[illegible] [illegible] [illegible]
-ign, as well as the ravages of the riot, named the assaults
of Nika, which in 532 destroyed a part of the monuments of t
the capital.

The demands of Justinian were of all kinds. [2] We cite among
those of public utility the aqueduct called by the Turks Iere-
kessaeren and Sin-kir-direk (1001 columns), the latter (538)
being a masterpiece of the art of building; the Aqueduct of
Constantinople, likewise a model of science; a reconstruction
of the Zeuxippos, burned in 532; a bridge over the Sangarios
in Bithynia; the fortifications of Nicea, of Dara, of the Mo-
nastery of St. Sinai, and of Hadrea in Africa; among those of
municipal character, an amelioration of the Augusteion; in
the list of official monuments, a new Palace of the Senate at
the Augusteion, and in that of sumptuary structures, a recons-
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]

an elevated conception of his imperial role; on the other, t the political and economical impetus of the empire under his reign, as well as the ravages of the riot, named the sedition of Nika, which in 532 destroyed a part of the monuments of t the capital.

The demands of Justinian were of all kinds. [2] We cite among these of public utility the cisterns called by the Turks Iere= batanserai and Bin-bir-direk (1001 columns), the latter (528) being a masterpiece of the art of building; the Aqueduct of Constantinople, likewise a model of science; a reconstruction of the Zeuxippos, burned in 532; a Bridge over the Sangarios in Bithynia; the fortifications of Nicea, of Dara, of the Monastery of Mt. Sinai, and of Haidra in Africa; among those of municipal character, an embellishment of the Augusteion; in the list of official monuments, a new Palace of the Senate at the Augusteion, and in that of sumptuary structures, a rebuil-
129 ding of the Chalce in the imperial Palace; in the religious
130 series, the Church of Ss. Sergius and Bacchos, erected soon after the accession of the sovereign; that of S. Irene (532); that of S. Apostles (536-546), destroyed, but to be imagined from a description [1] and from related buildings; [2] particularly S. Sophia (532-537), the "Great Church", one of the marvels of universal art, whose erection by the care of two artists of Asia Minor, Anthemios of Tralles and Isodoros of Miletus was one of the chief affairs of the reign. [3]

Note 2. They furnished the historian Procopius with the m material for a book; De Aedificiis.

Note 1. See Procopius, De Aedificiis.

Note 2. S. Marco of Venice and S. Front of Perigueux.

Note 3. In 553, S. Sophia suffered from an earthquake; the dome fell in 558; it was rebuilt in 558-562 by a nephew of I Isodoros of Miletus, of the same name; it was afterwards strengthened by great buttresses.

As much as the epoch of Justinian had been propitious to t the flourishing of the art of building, just as little were the three succeeding centuries. At first, until the accession of the Isaurian dynasty (717), the empire passed through a mournful epoch of anarchy and of disastrous reverses; then after order and peace had been restored, to the political cr-

crisis succeeded a religious one, resulting from the quarrel of the iconoclasts, otherwise stated to be a twofold struggle of reason against the idolatry of the worship of images, and of the lay principle against the invasions of monachism. Doubtless building continued; there even appear the development of some germs of novelties, notable in the productions of the Justinian school. Yet the impulse was weakened, and we can only cite the embellishment of the imperial Palace; a luxurious hall of state, called Chrysotriclinos, erected by Justin-II (565-578); two others, the Lausiacos and the Justinianos, were works of Justinian II at the end of the 7 th century; the Church of the Virgin of Pharos (middle of the 8 th century); finally, a magnificent residence, called Triconque, erected by Theophilos (829-842); the churches of Constantinople, by the Turks made into the Mosques of Kalender-hane-Djami and Hodja-Mustapha-Pacha (7 th century), that of Athens called t the Little Metropolitan or Panagia Gorgopiko (beginning of t the 9 th century).

2. From middle of 9 th to middle of 12 th century.

The Macedonian dynasty (867-1057) restored conditions analagous to those existing in the 6 th century. Delivered from
(8) anarchy, strengthened by the resumption of a part of its lost provinces, benefited by immense economical resources, exalted by brilliant conquests of its enemies, and impelled by the i impulse retained by the minds from the long "quarrel about t the images", the Byzantine world sacrificed to luxury and art more than it had ever done.

The government, in particular, organized fascinating representations, and most of the sovereigns, without counting the cost, applied themselves to the creation of a fairy stage of their official and private life.

The founder of the dynasty, Basil I (867-886) gave an example by ordering a comfortable and luxurious Palace, the Kenourgion, and only in Constantinoble 43 churches, the principal one of these, the "New" (Nea) was consecreted in 881 and is known by accurate descriptions. [1] From the second half of the 9 th century, without being able to fix the time of their erection, date the Cathedral of Heraclea (Eregli) on the Sea of Marmora; the Church of Dormition at Nicea; the church of Skri-

[illegible] (Fig); at Gunbaniongie are the Sanctuari-
es, which have covers the Mosques of Kiliz-Mosque-Ajami and
of Ali-Ajami.

[illegible] monastic buildings.

In the account of the 12 th century may be assigned a transla-
tion of the frames of [illegible] by Mingdonne Thosar
[illegible] (1080-1090) and built to form towers a tomb. The Monasteries
of Lavra, of Iviron and of Vatopedi on Mt. Athos are evidence
of the epoch of monastic legislation as the change from the 12 th
century to the next.

Of the production of the 11 th century, nonetheless greater,
and that may be taken from the first half of the period, two
[illegible] of Sainteres, that of S. Nicolas and of Monsterion. 8

at Constantinople [illegible] the Mosque of Sonnecou-Ajami; two as
the Monastery of S. Luke in Phocis: that of S. Nicodemus at
[illegible]
[illegible]
ik by Tamerlan III (1328-1404). As for the second part of the
century, the monumental inventory attributes to him the "mar-
ques of Constantinople cause Imrokoks (Kilisse-Ajami) and
Panaghiamone (Tanari-Isa-Mesjid), and that of the Monastery
of Ragoun, contemporary with the 14th and of the century.

The third quarter of the century was again a period of mag-
[illegible]
of joies and relative prosperity. Iconiastique was aven-ges-
ment to great palaces, churches and monastic chapels; such w
ere as the end of the golden Horn the splendid Jasile of Ba-
nanesar at Constantinople, such were the Churches of Mene t
the Mores (Kurie-Ajami), of Panoscator (Zeiek-Ajami), of
Antoniots (Ani-Ajami), all three dating from the first half
of the 14 th century. Such again were the Church of Meteora
and that of the Kouk near Naupia (Ilias), erected about the
[illegible]
[illegible]
[illegible]

Skripon in Beotia (874); at Constantinople are the Sanctuaries, which have become the Mosques of Atik-Mustapha-djami and of Gul-djami.

Note 1. See Constantine Porphyrygenete, Life of Basil; Photius' Homilies.

To the account of the 10 th century may be assigned a transformation of the Palace of Boucouleon by Nicephoros Phocar (963-969); the Oratory of the Saviour, that John Zimisces (9 (969-975) had built to find therein a tomb. The Monasteries of Lavra, of Iviron and of Vatopedi on Mt. Athos are evidence of the epoch of monastic impulse at the change from the 10 th century to the next.

Of the production of the 11 th century, doubtless greater, and that may be dated from the first half of the period, two Churches of Salonica, that of S. Elias and of Theotokos, [2] now the Mosques of Eskiserai and of Kazandjilar-djami; [2] one at Constantinople became the Mosque of Boudroun-djami; two at the Monastery of S. Luke in Phocide; that of S. Nicodemus at Athens; that called Nea Moni at Chios (about 1050). Let us add as vanished but described, the important Peribleptos built by Romain III (1028-1034). As for the second part of the century, the monumental inventory attributes to him the Churches of Constantinople named Theotokos (Kilisse-djami) and P Panachrantos (Fenari-Issa-Mesdjid), and that of the Monastery of Daphni, contemporary with the last end of the century.

Note 2. Sometimes erroneously named S. Bardias.

The third quarter of the century was again a period of anarchy and failure. But then after a hundred years, the dynasty of Comnenes (1081-1185) maintained the empire in a state of power and relative prosperity. Architecture was anew desired to erect palaces, churches and monastic chapels; such w was at the end of the Golden Horn the splendid Castle of Blachernes; at Constantinople, such were the Churches of Mene t tes Choras (Kahrie-djami), of Pantocrator (Zeirek-djami), of Pantepopte (Eski-djami), all three dating from the first half of the 12 th century; such again were the Church of Merbaca and that of Nea Moni near Nauplia (1144), erected about the middle of the century; S. Pantelimon at Salonica; of Kosmosoteira at Feredjik in Thrace (1152); S. Theodore and the Kap-

[illegible] de Amenay; S. Trinia of Monreale etc.

The production of the three sculptors just reviewed manifests, however in and according to the programme which tended to [illegible] and a more elegant appearance.[1] This truly antique the appearance of the "second golden age", which has been proposed for this phase of the career of Byzantine art.

Note 1. *In the page that is devoted to the building of [illegible] of the evolution," on the "chora", grace and elegance of [illegible]*

B. From the decline of the 14 to century.

In the decline of the 14 to century, commenced an epoch of [illegible] decadence for Byzantine civilization. Thence Angelus (1185-1204), the Latin emperors (1204-1261), the Paleologus (1261-1453), the empire changed into a [illegible] [illegible] either the government, without power and resources, or private individuals, impoverished by a profound industrial and commercial depression, could [illegible] a secular decay. Occasionally occasion to give an example of great monumentals.

[illegible] to pay, the [illegible] [illegible] [illegible]

Kapnikarea at Athens; S. Sophia of Monemvasie etc.

The production of the three centuries just reviewed manifests, indeed in all relating to the programme with regard to construction and effect, a fruitful energy, generating new arrangements and a more elegant appearance. [1] This truly authorizes the appellation of the "sacred golden age", which has been proposed for this phase of the career of Byzantine art.

Note 1. In the pages that he devoted to the buildings of Basil I, Constantine Porphyrygenetes insists on the "novelty of the distribution," on the "charm", grace and elegance" of the arrangement.

3. From the decline of the 12 th century.

At the decline of the 12 th century commenced an epoch of irremediable decadence for Byzantine civilization. Under Angelus (1185-1204), the Latin emperors (1204-1261), the Paleologues (1261-1453), the empire entered into decomposition. Neither the government, without power and resources, nor private individuals, impoverished by a profound industrial and commercial depression, could furnish a secular demand. Constantinople ceased to give an example of great undertakings. -- We have to cite only the double Church, which the Turks m made into the Mosque of Fetije-djami; Salonica likewise restricted its demands, which are recalled only by the Church of S. Apostles (1312-1315), and that became the Mosque of Yakoub Pacha.

In fact, architecture found itself reduced to modest provincial programmes. Such were those of the Churches of Arta, n named Parigoritissa (end of 13 th century), S. Basil and S. Theodore (14 th century); the Church of Kalabaka (14 th century); the seven sanctuaries of Mistra, capital of the department of the Morea (six of the 14 th century); the Metropolitan (1312), S. Theodore, Panagia of Brontochion, Evangelisteria, S. Sophia, Peribleptos; one of the 15 th, Pantanassa; S. Sozon and S. Elias at Geraki in Laconia; the Monasteries of Meteora (middle of 16 th century) near Kalabaka in Thessaly, etc.; particularly structures extending the monastic group of Mt. Athos, from the 13 th to the 16 th centuries -- monartery of Chilandari (12-13 th century), of Pantocrator (1363), of
184 Esphigmenou (14 th century), of S. Paul (15 th century) and

of Koutloumousi (1540).[1]

Note 1. For the three Churches of Trebizond -- Panagia Chrysophalos, S. Sophia, S. Eugenios -- occasioned by the establishment in that city in the 12 th century, of a branch of t the Comnene family, driven from Constantinople by the Latin conquest, see Part I, Section II of the same Book.

These edifices attest, that in spite of unfavorable conditions for a long time, Byzantine architecture retained the impulse and remained capable of making innovations in details. Yet it was condemned to gradually lose creative energy and to pass into formulas and repetitions.

[illegible]

[illegible]. -- Radiation.

I. Natural Conditions.

The conditions of the career of Byzantine architecture, both natural and human, were favorable to its progress.

As for the former, we ask the reader to refer to the pages devoted to the two first epochs of Egean architecture. (Volume I, pages 177, 257).

We shall here limit ourselves to observing how the geographical position of Byzantium midway between Europe and Asia was propitious for the success of a resumption of the effort to harmonize the esthetic ideals of the East and the West, for which the Egean region seemed predestined; we shall also note the advantage that the architects of the capital must have derived from the existence of magnificent quarries of Proconnesian marble in the vicinity of the city.

II. [illegible]

They again benefited by the ample resources placed at their disposal by official commands, as well as by the early providing of abundant and skilful workmen, that on the one hand, carried on for them the activity of an industry essentially artistic, [2] on the other, the frequency and the grandeur of [illegible] from the intellectual energy, that maintained the theological disputes, and from the 9 th century aroused a brilliant renaissance of Hellenic culture; [1] finally, they had at command [illegible]

[illegible]

Note 1. The University of Constantinople was founded by T [illegible] *had been closed by Justinian. Reorganized at the middle* [illegible]

[illegible] *cost; note that one of the authors of S. Sophia, Anthemios of Tralles, wrote a treatise on machines.*

Among the most distinctive traits of Byzantine civilization

Chapter 2. Natural and Human Conditions. -- Influences. -- Radiation.

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II. Hsman Conditions.

They again benefited by the ample resources placed at their disposal by official commands, as well as by the eary providing of abundant and skilful workmen, that on the one hand, c carried on for them the activity of an industry essentially artistic, [2] on the other, the frequency and the grandeur of the monumental undertakings; they derived no less advantage from the intellectual energy, that maintained the theological disputes, and from the 9 th century aroused a brilliant renaissance of Hellenic culture; [1] finally, they had at command technics relatively scientific and excellent tools. [2]

Note 2. Note particularly the marble industry of Proconnesus, which exported ofor the elements of architectural ornamentation, particularly the capitals.

Note 1. The University of Constantinople was founded by T Theodosius II, but had declined, and the schools of Athens h had been closed by Justinian. Reorganized at the middle of the 9 th century, the former soon became an ardent centre of intellectual activity.

Note 2. The Byzantine name for the architect is "mechanikos"; note that one of the authors of S. Sophia, Anthemios of Tralles, wrote a treatise on machines.

Among the most distinctive traits of Byzantine civilization

tion of its architecture; an entirely Asian passion for ostentation and splendor; a subtle mentality, revealed by the equally traditional legendary refinements of an artful diplomacy and a cavilling theology (pages 101, 160-165); finally a conservative spirit, and a marked taste for formulas and regularity.

The art of building must participate in that last characteristic as much as possible, since it was in large measure official,[2] and because the mode of training architects and the system of work formed for it a powerful cause of unity in time, compensated indeed by another, equally energetic, of variety in space. There existed no schools in which architecture might be learned; the practice of it was the perquisite of a certain number of families interested in attaching themselves to it by reason of the immunities thereby assured,[3] methods and recipes being transmitted from father to son. On the other hand, the workmen were free laborers paid by the day or piece, grouped in societies and confined to the routine applications of certain processes.[4] Always for the workmen as f for the architects occurred examples of removals; indeed from time to time was a call to the capital, when great works were [illegible] tances, of plans, architects, foremen, and even of wrought m materials.

[illegible] architect operated.

[illegible] IV, 2).

[illegible] compositions under the direction of a first master.

[illegible] ruction of S. Sophia to two masters from Asia Minor, and the

were three, which must necessarily be reflected in the production of its architecture; an entirely Asian passion for ostentation and splendor; a subtle mentality, revealed by the equally traditional legendary refinements of an artful diplomacy and a cavilling theology (pages 151, 160-165); finally a conservative spirit, and a marked taste for formulas and regularity.

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Note 2. The general direction of architectural works belonged to a functionary, named Oikistos. Like the count of the aqueducts, he was a dependent of the chancellor. As previously at Rome (Volume I, pages 440, 441), every enterprise was conducted by a responsible director, under whose control the architect operated.

Note 3. "Architects enjoyed immunity (exemption from all p personal burdens, so that they might more easily teach their children the practice of their art." Theodosian Code. (XIII, IV, 2).

Note 4. The society (corporation) comprised masters and c companions under the direction of a first master.

Note 5. See on the one hand, the attribution of the construction of S. Sophia to two masters from Asia Minor, and the

presence of mosaics from Tesuria in Constantinople, on the other -- without speaking of the exportation of decorative ela-

on and columns for the church, that he proposed to erect in that city.

III. Influences.

We have previously announced, and the result of our analys-

architecture was the result of a concurrence of various infl-

from the Gothic West, in a much smaller degree and later.

And first, it is inconceivable that the "second Rome"-- such was the significant name attached to Byzantium by Constantine --; may not have been in large measure according to the

transplanted to the new capital, may not in its new palaces

it was accustomed; finally and above all, that it may not have called architects famous in Rome.[1]

competitor in Hellenistic art, which then flourished in the great cities of the eastern Mediterranean, particularly at Ephesus, Antioch and Alexandria; so much the more because from these cities came the religious impulse. In fact, the masterpiece of Byzantine architecture, S. Sophia, was the result of the collaboration of a man from Tralles and of another from Miletus, and if in the end the influence of Hellenism

its sway in the bad times, after the state had lost its Asian

The energy and the success of the estuatic intervention of western Asia were necessary consequences of the religious prestige, which were select regions of theological speculation and of monachism (pages 34, 108). Syria imposed its concept-

presence of masons from Isauria in Constantinople, on the other -- without speaking of the exportation of decorative elements in Proconnesian marble mentioned later -- the sending by the empress Eudoxia to Porphyros, bishop of Gaza, of a plan and columns for the church, that he proposed to erect in that city.

III. Influences.

We have previously announced, and the result of our analysis will confirm it later, that the orientation of Byzantine architecture was the result of a concurrence of various influences, emanating from the Hellenistic-Roman part; in Asia, from Mesopotamia-persia, Syria, Anatolia and Armenia; finally from the Gothic West, in a much smaller degree and later.

138 And first, it is inconceivable that the "second Rome"-- such was the significant name attached to Byzantium by Constantine --; may not have been in large measure according to the model offered by the ancient city; that the Roman nobility, transplanted to the new capital, may not in its new palaces have restored the arrangements and the appearances to which it was accustomed; finally and above all, that it may not have called architects famous in Rome. [1]

Note 1. Note that until the end of the 9 th century, Latin remained the official language of the Byzantine empire.

Yet it was fated that Roman art should find a victorious c
139 competitor in Hellenistic art, which then flourished in the great cities of the eastern Mediterranean, particularly at Ephesus, Antioch and Alexandria; so much the more because from these cities came the religious impulse. In fact, the masterpiece of Byzantine architecture, S. Sophia, was the rerult of the collaboration of a man from Tralles and of another from Miletur, and if in the end the influence of Hellenism suffered from the increasing vogue of the East, it resumed i its sway in the bad times, after the state had lost its Asian provinces.

The energy and the success of the esthetic intervention of western Asia ware necessary consequences of the religious prestige, which were select regions of theological speculation and of monachism (pages 33, 106). Syria imposed its conception of relief decoration; Anatolia furnished most of the rel-

[illegible]

[illegible]

9 th century it fell to that country to supply Byzantium with administrators, soldiers, emperors, and also architects;[1] f from Mohammedan Mesopotamia, whose brilliant civilization at about the same time was revealed to the Byzantine world as a result of the intimate commercial and political relations, w [illegible]; [2] [illegible] [illegible] some "Satin" types into the empire.

[illegible] *as and John Zimisces. In 989, the dome of S. Sophia having been damaged by an earthquake, an architect named Tiridates was called from Armenia.*

[illegible] *himself a "Saracen" palace; a partition in the imperial garde-* [illegible] *th century, the competition of the Persian angle trumpet with* [illegible] *struction).*

Subjected to such numerous influences, so varied and among which are found exotics, Byzantine architecture might have o been hybrid and inorganic. What removed the danger was a pre- [illegible] ng, and after the 9 th century developed that renaissance of [illegible] ited a nucleus of adhesion, a dominating energy and a point of direction.

[illegible] by the concentration of the vital forces of the empire at Constantinople; as a result of which there were gathered and in contact talents of varied origin, and a mutual interpenetration of provincial and foreign esthetic variations.

Indeed, it was substantially the metropolitan school, which [illegible]

IV. Radiation.

In its turn, this radiated afar, impressing both the archi- [illegible]

religious programmes.

140 Byzantine architecture again drew from more distant sources. It borrowed from Sassanian Persia; from Armenia, when in the 9 th century it fell to that country to supply Byzantium with administrators, soldiers, emperors, and also architects; [1] f from Mohammedan Mesopotamia, whose brilliant civilization at about the same time was revealed to the Byzantine world as a result of the intimate commercial and political relations, w which this held with Baddad; [2] finally in the 13 th century with western Europe, after the "Frank" conquest had introduced some "Latin" types into the empire.

Note 1. Note the Roman emperors Lecapene, Nicephorus Phocas and John Zimisces. In 989, the dome of S. Sophia having been damaged by an earthquake, an architect named Tiridates was called from Armenia.

Note 2. The emperor Theophilus (829-842) had erected for himself a "Saracen" palace; a pavilion in the imperial gardens was termed the "Persian House". -- Note that after the 10 th century, the competition of the Persian angle trumpet with the Byzantine expedient of the pendentive. (See further, Construction).

Subjected to such numerous influences, so varied and among which are found exotics, Byzantine architecture might have b been hybrid and inorganic. What removed the danger was a preponderance of Hellenic genius, that existed from the beginning, and after the 9 th century developed that renaissance of Grecian culture previously mentioned. Thanks to it, there existed a nucleus of adhesion, a dominating energy and a point of direction.

Note further, that the work of combination was facilitated by the concentration of the vital forces of the empire at Constantinople; as a result of which there were gathered and in contact talents of varied origin, and a mutual interpenetration of provincial and foreign esthetic variations.

Indeed, it was substantially the metropolitan school, which constituted the Byzantine formula of the art of building.

IV. Radiation.

In its turn, this radiated afar, impressing both the architectural styles of the Sassanian and Mohammedan civilizations

as well as those of the Christian world; those of northern A Africa, of Syria, Anatolia and Armenia in Asia, like those of Balkan, Russian, Italian, Spanish, German and French Europe.

141 Chapter 3. Programmes and their Realizations.

Analysis of the programmes realized by Byzantine architecture leads to two remarks of general application:-- the arrangement of great secular buildings always proceeds from the s same principle as that of religious edifices; at first the f fashion was for oblong plans, then in a large measure for structural reasons, -- favor passed to grouped, central or radiating arrangements.

I. Municipal, Public and Military Programmes.

Byzantine architecture -- otherwise in conformity with the climatic conditions of its territory -- shared the taste of its Hellenistic and Syrian rivals for avenues and squares with single or double porticos, isolated or attached to the houses.

It understood how to ensure an abundant supply of water by means of aqueducts and cisterns; the latter were frequently colossal, and in the Alexandrine mode were covered by vaults supported by rows of columns. [1]

Note 1. There may be taken as an example the cistern in Constantinople named Bin-bir-direk; it occupied an area of 38,750 sq. ft., and its covering was supported by 212 columns.

We know that in its essential traits the Hippodrome of Constantinople reproduced the Great Circus of Rome; that the building of the University of the capital -- the Tetradision, comprised an octagon and eight porticos or vaulted halls for the races. On the contrary, we lack information of the Byzantine realization of a programme for baths; indeed they do not appear to have been comparable to the Roman.

Byzantine fortification (87) differed little from that conceived by the ancient East (Volume I, pages 120, 161, 396). It opposed to the enemy the fourfold obstacle of a wide and deep ditch; of a bank surmounted by a battlemented parapet; an outer wall; finally, an enclosure averaging about 40 ft. high, but which might attain twice that height; frequently an additional resistance was provided by redoubts, citadels and outworks. The walls were of solid masonry with battlements, provided with a passage, sometimes flanked by triangular bastions, more frequently by towers of rectangular, polygonal or circular plans, which rose above them; the internal enclosure

[illegible] to the surfaces of the [illegible].

Note 2. The walls of [illegible] were erected by Theodosius II, were 58 ft. high and flanked by towers varied at intervals of 164 ft; the [illegible] are 88.6 ft. [illegible].

[illegible] Dimensions [illegible].

[illegible]. Fallen. [illegible].

[illegible] be [illegible] [illegible] high. It often comprised a large [illegible] always on the [illegible] [illegible] porticos, galleries, loggias, [illegible] and latterly [illegible] [illegible] it was crowned by a [illegible] or surmounted by a [illegible]. In the interior, a vestibule of small [illegible] [illegible] the [illegible] or [illegible] of a [illegible] the [illegible]; in the central nave a [illegible] [illegible] [illegible] [illegible] the entire height of the building and consequently was equivalent to a covered [illegible] [illegible] [illegible] by [illegible] [illegible] [illegible] [illegible]

largely dominated the external one, and the towers of one corresponded to the curtains of the other. [2]

Note 2. The walls of Constantinople were erected by Theodosius II, were 36 ft. high and flanked by towers spaced at intervals of 164 ft; the moat was 65.6 ft. wide.

II. Domestic Programmes.

House. Palace. Monastery.

The urban type of the Byzantine house was grouped and rose two or three stories high. It often comprised a tower; nearly always on the facade were porticos, galleries, loggias, a and latticed balconies; sometimes it was crowned by a terrace or surmounted by a belvedere. In the interior, a vestibule of small depth extended the entire length or for a part of t the front; in the second story was a great central hall forming the selamlik, that often occupied the entire height of t the building and consequently was equivalent to a covered court. Around it were distributed the chambers, access to which was doubtless arranged by a gallery or balconies of wood. (88; 90). [3]

Note 3. See at Constantinople the dwelling called Tefkour Serai, which appears to date from the 13 th century; at Melnic in Macedonia, a house of the 11 th century and numerous e representations by the miniatures of manuscripts.

The Imperial Palace, in the manner of the East, presented a complex entirety of separate buildings, placed without order in a fortified enclosure decorated by gardens (89).

The state residence contained a court with porticos, a monumental vestibule, and finally a great room (triclinos) for use, both as a throne and a festal hall. This was at first a basilica with three aisles, at the rear of which rose a platform, extended by an apse in which was seated the sovereign; then in the 6 th century being a hall with central or radiating plan; either an octagon, like the Chrysotriclinos of Justin II, from which on each side projected an apse supporting a gallery at the springing of its dome; or a triapsal room, such as that of the Palace of Theophilus. Besides this were one or more chapels.

The description of the Kenourgin, erected by Basil I, indicates that a harem was composed of a salon giving access at

one side to a dining room, at the other to a sleeping chamber and a study; a reading room, a library and an oratory. Ablutions were supplied for summer and cisterns for winter.

The gardens were of small extent, planted with fruit and ornamental trees, variously influenced by Cloisters and streams, with arbors and covered walks.

The Byzantine monastery was inscribed in a square of grand dimensions enclosed by high walls. To their internal surfaces [illegible] [illegible] [illegible]

one side to a dining room, at the other to a sleeping chamber with alcove; a dressing room, a library and an oratory. There were apartments for summer and others for winter.

The gardens were of small extent, planted with fruit and ornamental trees, carefully refreshed by fountains and streams, with kiosks and covered walks.

The Byzantine monastery was inscribed in a square of great dimensions enclosed by high walls. To their internal surfaces were attached several stories of cells, for which galleries furnished acces.. After the church, the most important structure was the refectory, whose extremity was frequently in the form of an apse for receiving the table of the abbot.

III. Religious Programmes.

Byzantine architecture realized four types of church, an o oblong, a central, a combination of the two, and finally a radiating one.

The vogue of the first was brief and did not survive the infancy of the school; as soon as this had made its growth, it marked a taste for the second, which further was as ancient as the other; because adult, it tried the third, and finally decided for the last. Indeed its preferences were in great measure determined by the fact, that it adopted the system of the dome for the covering.

On the whole, religious programmes were in accordance with the canon required by the Christian conception of the worship. (Page 28). They were always marked by some peculiarities. T Thus they isolated the sanctuary behind an opaque screen, to which rich ornamentation by images gave the name of iconostasis (91, 7,cc). So again, the atrium was suppressed, and in compensation the narthex was extended, doubling it, adding c chapels, [1] porches, even devising proportions greater than t those of the church proper, [2] until it extended along the sides of the latter (91, 7,15,16,17,18; 94). [3] Finally, at least during the first half of the career of Byzantium, galleries were established in the side aisles, with a view of both augmenting the capacity of the edifice, and of facilitating the separation of the sexes required by the customs of the East; [1] these galleries were sometimes joined above the narthex, and were accessible by stairways placed at the ends of t

the latter (Fig. 52).

[illegible]

Note 2. See certain Churches of Athos dating from the 14th, 15th and 16th centuries (Chilandari and Xastamonitou).

Note 3. See S. Apostles at Salonica.

Note 4. On the railing of that extending at the north of S. Sophia of Constantinople, an inscription marks the "place

[illegible]

1. Conceived on an oblong plan, the Byzantine church was a basilica, either with a single aisle -- this arrangement appears to have been current in use in western Asia Minor (9 (91, 2,3) -- or with three aisles; in this case the side aisles were separated by colonnades, and were reduced in width as well as in height, lessening the height of the gallerial (91, 1,4,5). At any rate, the single or principal aisle was prolonged at the sanctuary by a semicircular apse, generally pierced by windows, and whose diameter equaled its width (91, 1,4).[2]

Note 2. An examples, we will cite Eski-djouma and S. Deme-

[illegible]

2. The central arrangement was realized in two forms; -- on the one hand -- S. George of Salonica offers a specimen -- a circular or polygonal rotunda, in the Hellenistic-Roman fashion, with the addition of an apse (91, 6); on the other, an area defined by a series of isolated supports bearing a dome and placed in the middle of a nave of rectangular plan, one of whose sides is curved as an apse. The Church of Ss. Geor-

[illegible]

on of a formula familiar to Syria and Anatolia (pages 46, 73), and whose principle remained dear to Byzantine art until the end of its career;[4] thanks to an arrangement of exedras, opened in colonnades in those sides corresponding to the angles

[illegible]

with the general form of the edifice and with its purpose as the nave of a sanctuary (90; 91, 8).

Note 4. See paragraph 4, the radiating plan.

[illegible]

of our classification, and which appears to have obtained the

[illegible]

the latter (81; 85).

Note 1. See the Churches of Athos. (11 - 16 th centuries.

Note 2. See certain Churches of Athos dating from the 14 th, 15 th and 16 th centuries (Chilandari and Kastamonitou).

Note 3. See S. Apostles at Salonica.

Note 4. On the railing of that extending at the north of S. Sophia of Constantinople, an inscription marks the "place of the very noble patrician, our mistress Theodora."

1. Conceived on an oblong plan, the Byzantine church was a basilica, either with a single aisle -- this arrangement a appears to have been current in use in western Asia Minor (9 (91, 2,3) -- or with three aisles; in this case the side aisles were separated by colonnades, and were reduced in width as well as in height, lessening the height of the galleriei (91, 1,4,5). At any rate, the single or principal aisle was prolonged at the sanctuary by a semicircular apse, generally pierced by windows, and whose diameter equaled its width (91, 1,4). [2]

Note 2. As examples, we will cite Eski-djouma and S. Demetrios at Salonica; S. John Stoudion at Constantinople.

2. The central arrangement was realized in two forms; -- on the one hand -- S. George of Salonica offers a specimen-- a circular or polygonal rotunda, in the Hellenistic-Roman fashion, with the addition of an apse (91, 6); on the other, an area defined by a series of isolated supports bearing a dome and placed in the middle of a nave of rectangular plan, one of whose sides is curved as an apse. The Church of Ss. George and Bacchos at Constantinople forms a perfected application of a formula familiar to Syria and Anatolia (pages 46, 73), and whose principle remained dear to Byzantine art until the end of its career; [4] thanks to an arrangment of exedras, opened in colonnades in those sides corresponding to the angles of the external square; a central octagon is harmonized, both with the general form of the edifice and with its purpose as the nave of a sanctuary (80; 91, 8).

Note 4. See paragraph 4, the radiating plan.

3. The combination that characterizes the third division of our classification, and which appears to have obtained the favor of the men of the first half of the 6 th century, [5] con-

constituted an element of centralization with the support of a great dome on four arches above massive piers, and a factor of the oblong arrangement by filling the north and south arches by means of superposed colonnades, and by the insertion of a bay between the eastern arch and the sanctuary and between the western arch and the narthex. More complicated, that producing S. Sophia of Constantinople, accenting the central mode by choosing for the extremities of the nave a semicircular outline with exedras (91, 82; 91, 7,9,10).[1]

Note 3. See S. Sophia of Salonica, S. Irene and S. Sophia of Constantinople.

[illegible]

on the direction of the main axis.

[illegible]

jects on each side a nave with three aisles, whose area approximates its own; so that the entirety outlines a cross. From the first -- witness the S. Apostles at Constantinople[2]

[illegible]

tion of parts of side aisles in the reentrant angles. Edifices like those at Constantinople, which are now the Mosques Zodja-Mustapha-djami (91, 15) and Gul-djami (91, 12), reveal the origin and progress of the type. Indeed, the first reproduced on its transverse axis the arrangement of the main axis of S. Sophia, and the second is a free translation of the composite formula to be mentioned, which in removing their galleries from the northern and southern arches of the supports of the dome, produced a cruciform arrangement in the upper half of the church. That became the rule, even for the ground story, dating from the renaissance of the school in the 9 th century,[1] and it may fairly be considered as that most expressive of Byzantine taste (91, 14,15,17,19). Note that after the 11 th century,[1t] was frequently approximated by that of the primitive type with a semicircular outline of the northern and southern arms of the cross (91, 15; 105, 6).[2]

Note 2. See S. Marco at Venice.

Note 1. It was adopted for the New Church in the Palace

constituted an element of centralization with the support of a great dome on four arches above massive piers, and a factor of the oblong arrangement by filling the north and south arches by means of superposed colonnades, and by the insertion of a bay between the eastern arch and the sanctuary and between the western arch and the narthex. More complicated, that producing S. Sophia of Constantinople, accenting the central mode by choosing for the extremities of the nave a semicircular outline with exedras (81; 82; 91, 7,9,10).[1]

Note 5. See S. Sophia of Salonica, S. Irene and S. Sophia of Constantinople.

Note 1. In brief, the plan of S. Sophia of Constantinople is merely that of Ss. Sergius and Bacchos changed by extension in the direction of the main axis.

4. In the radiating plan, the part supporting the dome projects on each side of a nave with three aisles, whose area approximates its own; so that the entirety outlines a cross. From the first -- witness the S. Apostles at Constantinople[2] -- Byzantine architecture admits the projection of arms (91, 11). But from the 9 th century, these were included within a central form of rectangular shape, resulting from the insertion of parts of side aisles in the reentrant angles. Edifices like those at Constantinople, which are now the Mosques Hodja-Mustapha-djami)91, 13) and Gul-djami (91, 12), reveal the origin and progress of the type. Indeed, the first reproduced on its transverse axis the arrangement of the main axis of S. Sophia, and the second is a free translation of the composite formula to be mentioned, which in removing their g galleries from the northern and southern arches of the supports of the dome, produced a cruciform arrangement in the upper half of the church. That became the rule, even for the g ground story, dating from the renaissance of the school in t the 9 th century,[1] and it may fairly be considered as that most exbressive of Byzantine taste (91, 14,15,17,19). Note that after the 11 th century, it was frequently approximated by that of the primitive type with a semicircular outline of the northern and southern arms of the cross (91, 18; 105, 6).[2]

Note 2. See S. Marco at Venice.

Note 1. It was adopted for the "New Church" in the Palace of Basil I.

Note 2. See the Churcher of Lavra and of Vatopedi at Mt. Athos; those of S. Meteora in Thessaly; of S. Apostles at Athens; of Kalavryta; of Geraki etc.

Yet there never was a complete application of the radiating arrangement; it was opposed by the development of the narthex, which we have already mentioned, and particularly by the triple apses, which were normal from the renaissance of the 9 th century, and emphasized the orientation of the nave; so much the more because somebimes -- for example at Daphni (91, 16) -- the little apses opened into the main and not into the side aisles. Dating from the 13 th century, there was a tendency to elongate the eastern and western arms of the cross, and even as observed in certain churches of Misitra, [1] to arrange the second in the image of the nave of a basilica. (91, 21).

Note 1. See the Metropolitan, Panagia of Brontochion and of Pantanassa.

the passionate attention accorded to questions of construction; by the methodical and thoughtful character of its procedures; by the ingenuity of its methods, sometimes almost too [illegible] by it for some of the most difficult problems of the art of building.[2]

Note 2. If the credit contemporaries, the work of S. Sophia was entrusted to Anthemios of Tralles "because he was the most skilful engineer of the century, and doubtless the most fertile in invention, that has ever existed". (Procopius. I. 1; Agathias. History. V. 9).

[illegible]

[illegible] manufacture shaped into squares, tiles, or into pipes; the first measured on an average from 11.8 to 17.7 ins. on each side with a thickness of 1.58 to 2.85 ins. Marble was sought for the construction of columns, but the use of masonry of c cut stone was disliked; if stone materials were employed, they were treated like bricks, split into rubble, or even into slabs (98).

It knew how to adjust itself to the limited resources in t [illegible] offered by its domains (page 186).

Finally, enormous quantities of mortar were used, as much as possible, only lime produced by calcining marble was employed, and to give body to the mortar, to it was added pounded tiles or stone, according to the thickness assigned to it.

[illegible]. Procedures.

[illegible] and Portico.

[illegible]

Particularly in Greece, rubble and bricks were freely associated, the courses of the latter being repeated three to five times, so as to create a strong bonding of the mass (99). Sometimes in an edifice of brick, the piers of their vaults and of the great arches bearing the dome were built in cut s [illegible].[1]

Chapter 4. Construction.

Byzantine architecture particularly recommends itself by t the passionate attention accorded to questions of construction, by the methodical and thoughtful character of its procedures; by the ingenuity of its methods, sometimes almost too subtle; finally by the elegance of several solutions proposed by it for some of the most difficult problems of the art of building. [2]

Note 2. If the credit contemporaries, the work of S. Sophia was entrusted to Anthemios of Tralles "because he was the most skilful engineer of the century, and doubtless the most fertile in invention, that has ever existed". (Procopius. I. 1; Agathias. History. V. 8).

I. Materials.

The favorite material was terra cotta, that an excellent manufacture shaped into squares, tiles, or into pipes; the first measured on an average from 11.8 to 17.7 ins. on each side with a thickness of 1.58 to 2.35 ins. Marble was sought for the construction of columns, but the use of masonry of c cut stone was disliked; if stone materials were employed, they were treated like bricks, split into rubble, or even into slabs (96).

It knew how to adjust itself to the limited resources in t timber offered by its domains (page 166).

Finally, enormous quantities of mortar were used; as much as possible, only lime produced by calcining marble was employed, and to give body to the mortar, to it was added pounded tiles or stone, according to the thickness assigned to it.

152 II. Procedures.

Wall and Portico.

In general, the construction of the wall was careful. The materials were not arranged and the thickness war considerable.

Particularly in Greece, rubble and bricks were freely associated, the courses of the latter being repeated three to five times, so as to create a strong bonding of the mass (96). Sometimes in an edifice of brick, the piers of their vaults and of the great arches bearing the dome were built in cut s stone. [1]

Note 1. See the Churches of Sardes, the Trinity of Ephesus,

The thickness of the beds of mortar was considerable, at least equal to that of the squares, and it frequently made t two-thirds of the composition of the structure (36, 2).

The stone materials were also set in mortar, being otherwise entirely without cramps. When composite, the surfaces were solidly anchored to the nucleus of concrete by the penetration of transverse blocks set on edge (35, 1).

The construction absolutely prescribed the bonding of two [illegible] loaded parts of the masonry; in particular, the pi- [illegible] were independent of the adjacent structure.

Until the 8th century, the Byzantine school retained the tradition of the portico with architrave, as attested by the colonnades of the ground story in the Churches of S. John Studion and of Ss. Sergius and Bacchus in Constantinople (30). Yet it early preferred the arch resting on columns or piers.

The isolated supports of the great arches [illegible] dome were at first massive, the economy of material being limited to making their transverse section that of the impasts of the arches. A notable advance was accomplished about the 10th century by substituting for the great pier a group of four smaller ones, even of pillars and columns, whose resistance was equal, since the width was not reduced (37).

Likewise, the form of the Byzantine column reveals both care in perfecting it, taste and a faculty for artificial sola- [illegible] which this member was exposed. From the fact of very heavy loads and its relative slenderness, Byzantine architecture made shift and succeeded in strengthening it. At first as much as possible, they employed only monoliths set on edge. T Then against the danger of splitting the shaft, they protected it by reporting to the artificer; they banded with metal the ends of the cylinder, and to equalize the pressure, they [illegible] at both ends in the joints of the capital and base [illegible] layers of lead in sheets about 1/5 inch thick, and [illegible] many cases for the difference in the forms of the top of the

the Basilica of Philadelphia, and the piers of S. Sophia.

The thickness of the beds of mortar was considerable, at least equal to that of the squares, and it frequently made t two-thirds of the composition of the structure! (96, 2).

The stone materials were also set in mortar, being otherwise entirely without champs. When composite, the surfaces were solidly anchored to the nucleus of concrete by the penetration of transverse blocks set on edge (96, 1).

The construction absolutely proscribed the bonding of two unequally loaded parts of the masonry; in particular, the piers supporting the great arches bearing the dome or vaults were independent of the adjacent structure.

Until the 6 th century, the Byzantine school retained the tradition of the portico with architrave, as attested by the colonnades of the ground story in the Churches of S. John Stoudion and of Ss. Sergius and Bacchos in Constantinople (80). Yet it early preferred the arch resting on columns or piers.

The isolated supports of the great arches supporting the dome were at first massive, the economy of material being limited to making their transverse section that of the imposts of the arches. A notable advance was accomplished about the 10 th century by substituting for the great pier a group of four smaller ones, even of pillars and columns, whose resistance was equal, since the width was not reduced (97).

Likewise, the form of the Byzantine column reveals both care in perfecting it, taste and a faculty for artificial solutions. Because of the risks of crushing and of fracture to which this member was exposed, from the fact of very heavy loads and its relative slenderness, Byzantine architecture made shift and succeded in strengthening it. At first as much as possible, they employed only monoliths set on edge. T Then against the danger of splitting the shaft, they protected it by resorting to two artifices; they banded with metal the ends of the cylinder, and to equalize the pressure, they inserted at both ends in the joints of the capital and base malleable layers of lead in sheets about 1/5 inch thick, and which the before mentioned rings prevented from squeezing out. (99, 7). Finally, to compensate for the inequality, and in many cases for the difference in the forms of the top of the

capital and the section of the impost of the arch, they utilized an expedient, that we have already observed in Syria (page [illegible]), that of an intermediate member, an impost block, [illegible] posed on the capital, but soon out in the same block with it. ([illegible]; [illegible]; 110, 2-5).[1]

[illegible] Western of 1901 Columns at Constantinople ([illegible]).

Finally, a better adaptation of the base to its role resulted from an extension of its area, produced by the addition of a plinth, frequently reinforced at the angles by claws ([illegible] - [illegible]).

The normal construction of the arches was in bricks or stones. For the latter, economy was obtained by a trapezoidal s[illegible] of pottery ([illegible], 1). The operation was frequently facilitated by the application of the system, dear to Byzantine art, [illegible] most always, with a view of reducing the thrust of the arch, the curve was that of a suited semicircular arch, and the w[illegible] weight of the upper structure was relieved by arches ingeniously increasing the power of resistance. ([illegible], 6).

[illegible] was a constant practice on a great scale, of the system of strengthening by wooden ties, which was otherwise common in the East (volume I, page [illegible]). It is explained by the two-fold desire of preventing deformations of the structure during the periods of erection and of settlement, as well as of opposing the effects of earthquakes.

For a wall this was a series of timbers placed end to end; grillages formed by the crossing of longitudinal and transverse beams ([illegible], 4), or again, bands of joined planks forming a layer ([illegible], [illegible]).

[illegible] by the effect of one or more tons, anchored in the masonry above the supports ([illegible], 2,3,6). Sometimes precautions

capital and the section of the impost of the arch, they utilized an expedient, that we have already observed in Syria ((page 61), that of an intermediate member, an impost block, shaped as the frustum of an inverted pyramid, at first superposed on the capital, but soon cut in the same block with it. (98; 109; 110, 3-5). [1]

Note 1. The oldest dated example (528) is presented by the Cistern of 1001 Columns at Constantinople (95).

Finally, a better adaptation of the base to its role resulted from an extension of its area, produced by the addition of a plinth, frequently reinforced at the angles by claws ((82 - 85).

The normal construction of the arches was in bricks or stone. For the latter, economy was obtained by a trapezoidal s shape like voussoirs; the greater opening of the joints next the extrados was filled by mortar, tiles, or even fragments of pottery (99, 1). The operation was frequently facilitated by the application of the system, dear to Byzantine art, of an alternation of stones and bricks (995 2-4). When an arch was constructed of the latter, those near the top were sometimes arranged with horizontal beds in wedge form (99, 5). Almost always, with a view of reducing the thrust of the arch, the curve was that of a stilted semicircular arch, and the w weight of the upper structure was relieved by arches ingeniously increasing the power of resistance. (99, 6).

One of the most characteristic traits of Byzantine construction was a constant practice on a great scale, of the system of strengthening by wooden ties, which was otherwise common in the East (volume I, page 156). It is explained by the twofold desire of preventing deformations of the structure during the periods of erection and of settlement, as well as of opposing the effects of earthquakes.

For a wall this was a series of timbers placed end to end; grillages formed by the crossing of longitudinal and transverse beams (100, 4), or again, bands of joined planks forming a layer (100, 3).

It was the rule for the side thrusts of an arch to be opposed by the effect of one or more ties, anchored in the masonry above the supports (100, 2,5,6). Sometimes precautions

[illegible] against the overthrow of the layer by connecting [illegible] by ties (108, 7). It appears [illegible] that the two modes [illegible] (108, 1).

In cases of the strengthening of a wall by buttresses, these are placed in the interior of the surface (108, 3; 108, 1).

Note 1. The great structural constituents of a. Sophia at Constantinople (108, 1) are water conditioner.

III. Covering.

The construction of a gyrantine roof does not differ from that of the [illegible] of a vessel. It comprises a series of [illegible] or matters laiyen together and resting on the tops of [illegible] of carrying by a series of longitudinal purlins fixed at midhedge against their internal surfaces, as well as by cross beams, and spirons connecting by a tie (101).

[illegible] It does and practiced all modes of vaulting and the different procedures employed in the Western East, in Byzantinio-Roman western asia and in the Roman West. Logically, it subordinated its modes to structural expediency. So much so, that for the same ability, it had recourse to several ar- [illegible] construction.

[illegible] *[illegible] the same, and the [illegible].*

We shall say nothing of the tunnel vault, because it has a [illegible] exactly like as such.

[illegible]

In stone [illegible] a special [illegible]. Indeed by raising the p [illegible], instead of the intersection of two cylinders, exac- [illegible] [illegible] [illegible]

were taken against the overthrow of the latter by connecting them by ties (100, 7). It again occurred that the two modes for strengthening were combined by inserting a continuous layer of planks between the capitals and the imposts of the arches (100, 1).

157 In case of the strengthening of a wall by buttresses, these were placed in the interior of the edifice (100, 8; 105, 1).[1]

Note 1. The great external abutments of S. Sophia at Constantinople (108, 1) are later additions.

III. Covering.

The construction of a Byzantine roof does not differ from that of the framework of a vessel. It comprises a series of pairs of rafters halved together and resting on the tops of the walls. These were sometimes protected against the risk of bending by a series of longitudinal purlins fixed at mid-height against their internal surfaces, as well as by cross beams, and against spreading by a tie (101).

158 Normally, Byzantine architecture covered an interior by masonry. It knew and practised all modes of vaulting and the different procedures employed in the Persian East, in Hellenistic-Roman western Asia and in the Roman West. Logically, it subordinated its choice to structural expediency. So much so, that for the same edifice, it had recourse to several systems.[1] Finally, it realized numerous and important advances in construction.

Note 1. Thus at S. Sophia of Constantinople, there were associated the spherical vault on a square plan, the hemispherical niche, the cross vault, the cross vault raised as a dome, and the tunnel vault, they were respectively employed for covering the central bay of the great nave, the extreme bays, the lower story of the side aisles, the upper story of the same, and the narthex.

We shall say nothing of the tunnel vault, because it was c constructed exactly like an arch.

On the contrary, the Byzantine formula of the cross vault in bricks merits a special mention. Indeed by raising the p profiles, instead of the intersection of two cylinders, executed with difficulty,[2] it groups four compartments in equilibrium, which abut in pairs and can retain their connections

[illegible]

[illegible] of a series of horizontal arches, which it is possible to successively turn by the aid of a single movable centre. [illegible] results a [illegible] that allows the [illegible] vault to that of the mediaeval West on ribs (102, 9-11).[4]

Note 2. The stability depends on the quality of the masonry of the groins, and the diagonal curve is an ellipse.

Yet Byzantine architecture were early indicated a preferen- [illegible] with a [illegible].

[illegible] (St. Sergius and Bacchos at Constantinople) (103, 1), there elliptical (S. Sophia of Salonica (103, 8), S. Sophia of Constantinople and at Daphni (103, 3), elsewhere stilted [illegible] (103, 4).

There was likewise diversity in connecting the calotta to the support. At first -- S. Sophia of Constantinople affords an illustrious example of this -- it was placed directly on its support (103, 3); then -- S. Sophia of Salonica attends [illegible] century (103, 6) -- a drum pierced by windows was inserted between the two elements, and which was enlarged, until in the 9th century and following the evolution common to all a [illegible] (103, 4,5; 103, 2).

The construction of the Byzantine dome aimed at both reduc- [illegible] terials of low density were sought,[5] and by means of various [illegible] at S. Sophia of Constantinople, there was at regular interva- [illegible] bands converging at its vertex (103, 3); sometimes -- we can cite as examples the churches of St. Sergius and Bacchos and of Theotomos in Constantinople -- the shell was lobed, its angles acting like the bands just mentioned (103, 1,2). At [illegible] at Salonica, the covering sprung from the crowns of [illegible] -- [illegible]

without bonding, and whose junctions are made in an arc of a circle, conveniently traced. Each of these compartments is constructed of a series of horizontal arches, which it is possible to successively turn by the aid of a single movable centre; there results a convexity, that allies the Byzantine cross vault to that of the mediaeval West on ribs (102, 9-11).[2]

Note 2. Its stability depends on the quality of the masonry of the groins, and the diagonal curve is an ellipse.

Yet Byzantine architecture vere early indicated a preference for covering by means of brick domes, that it further applied with a rare mastery.

The curve by which the calotte was profiled varied, here r regwlar (Ss. Sergius and Bacchos at Constantinople) (103, 1), there elliptical (S. Sophia of Salonica (103, 6), S. Sophia of Constantinople and at Daphni (103, 3), elsewhere stilted (S. Apostles at Athens; Vatopedi) (103, 4).

There was likewise diversity in connecting the calotte to the support. At first -- S. Sophia of Constantinople affords an illustrious example of this -- it was placed directly on its support (103, 3); then -- S. Sophia of Salonica attests that the method was sketched from the beginning of the 6 th century (103, 6) -- a drum pierced by windows was inserted b between the two elements, and which was enlarged, until in t the 9 th century and following the evolution common to all a architectural styles, it took the form of a true central tower. (103, 4,8; 108, 2).

The construction of the Byzantine dome aimed at both reducing its weight and stiffening it. It was made very thin; materials of low density were sought,[2] and by means of various arrangements a sort of framework was realized. Sometimes, as at S. Sophia of Constantinople, there was at regular intervals a thickening of the shell by the projection of meridian b bands converging at its vertex (103, 3); sometimes -- we can cite as examples the churches of Ss. Sergius and Bacchos and of Theotokos in Constantinople -- the shell was lobed, its a angles acting like the bands just mentioned (103, 1,2). At other times, as verified in the vestibule of the Tomb of S. Demetrios at Salonica, the covering sprung from the crowns of small trumpets, otherwise termed little spherical arches --

[illegible] of two units of the lower range ([illegible]). [illegible] ring of masonry was [illegible] of curved tiles set [illegible] in the layers, [illegible] and forming [illegible] and indeformable [illegible] ([illegible]).

[illegible] one-fifth the [illegible] of ordinary ones.

Note 2. We noted the use of this system by the constructor [illegible] of Decoration at Spalato. Volume I, page [illegible].

In all modes, the lower portion of the shell -- its weak point, and the more so because it was pierced by windows, -- was strongly girdled by a band of masonry, profiled differently from the shell ([illegible]). Arches on engaged columns rendered the same service ([illegible], 2).

[illegible] fan-shaped masonry of a spherical niche by the excessive [illegible] of the [illegible] at the bottom and their too great [illegible] middle line of the niche ([illegible], 11); sometimes this was divided into a central portion in which the materials abutted as [illegible]

The Church of Ss. Sergius and Bacchus at Constantinople ([illegible]; [illegible], 1), and the extreme bays of that of S. Sophia in the [illegible] solve the problem of the overhang, against which [illegible] desire to cover by a dome an interior with square plan, the [illegible] octagon or arcades. The first of these edifices otherwise [illegible] permits it to rest directly on the top of the support, each [illegible] of that receiving the curved section of one of the sixteen lobes of the latter ([illegible]; [illegible], 11).

[illegible] Persia, [illegible] and that of the pendentive or spherical [illegible] (page [illegible]), but which was made its own by the

each impost resting on the crests of two units of the lower range (103, 5,7).[3] Better Still, each ring of masonry was c
161 constructed, not by a series of independent bricks, but by a chain of curved tiles set alternating in the layers, holding together and forming inextensible and indeformable bonds (103, 9).[1]

Note 2. Bricks from Rhodes were particularly esteemed, which had one-fifth the weight of ordinary ones.

Note 3. We noted the use of this system by the constructor of the Palace of Diocletian at Spalato. Volume I, page 487.

Note 1. See the ruined Chapel of S. Pantelemon at Mt Athos.

In all modes, the lower portion of the shell -- its weak p part, and the more so because it was pierced by windows, -- was strongly girdled by a band of masonry, profiled differently from the shell (103, 1,3,4,6). Arches on engaged columns rendered the same service (103, 2).

The same ingenuity appeared in the expedients by the aid of which the Byzantines evaded the difficulty, produced in the fan-shaped masonry of a spherical niche by the excessive closeness of the beds at the bottom and their too great enlargement toward the top; sometimes the beds intersected on the m middle line of the niche (103, 11); sometimes this was divided into a central portion in which the materials abutted as in marquetry, and into a border in which they radiated (103,12).

The Church of Ss. Sergius and Bacchus at Constantinople (80; 104, 1), and the extreme bays of that of S. Sophia in the same city (81; 82; 91, 7; 104, 2) teach us, that in order to s solve the problem of the overhang, against which collided the desire to cover by a dome an interior with square plan, the Byzantines tried the Syrian-Anatolian expedient of a central octagon on arcades. The first of these edifices otherwise m manifests a notable perfection; the lobed form of the calotte permits it to rest directly on the top of the support, each recess of that receiving the curved section of one of the sixteen lobes of the latter (103; 104, 1).

But this system was soon replaced by two others; that of t the angle trumpet, which Byzantine architecture borrowed from Persia,[1] and that of the pendentive or spherical triangle, superior in every respect, whose principle was derived from the same source (page 15), but which was made its own by the

[illegible]

[illegible] of the trumpet comprises several [illegible] the arch was accented by an archivolt [illegible] (104, 4); its form was [illegible] that of a portion of a spherical vault (104, 5), [illegible] that of a portion of a cone (104, 6); in the regions of Athos and in Greece, quite frequently was that of one-half a cloister vault, divided diagonally and supported by a front arch (104, 8); or again this was a niche on a drum, [illegible]

[illegible] by the spirit of analysis and of logic [illegible] the application on a great [illegible] to the angles of the square formed by the [illegible]

[illegible] es of octagons produced by the artifice of trumpets; in other [illegible] and whose edges rested on the curved top of the walls or on the extradoses of the divergent arches (104, 15; 21). The m[illegible] served as support; but generally it was a portion of a larger form, so that the surface of the calotte did not continue its own, and that the springing of the covering was clearly [illegible] horizontal curve of the penetrative in a manner to produce an [illegible]

[illegible] to be a portion of a vault, becoming a corbelled mass (1 [illegible])

[illegible] it in courses (page 106), he did not meet with the difficulty of corbelling in the angles. To obtain a dome, it was only necessary to build on the top of the supporting enclosure the four convex panels of the cross vault, previously defined, [illegible] the precaution to raise it enough to make the [illegible]

extension given to it.

Note 1. See page 15. Note the favor obtained by the angle trumpet after the 10 th century. Further, page 140, Note 2.

The Byzantine realization of the trumpet comprised several variations. Sometimes the arch was accented by an archivolt (104, 3) and sometimes not (104, 4); its form was sometimes that of a portion of a spherical vault (104, 5), sometimes t that of a portion of a cone (104, 8); in the regions of Athos and in Greece, quite frequently was that of one-half a cloister vault, divided diagonally and supported by a front arch (104, 9); or again this was a niche on a drum, whose base half projected and half receded (104, 10).

Guided by the spirit of analysis and of logic that animated it, the Byzantine school conceived the application on a great scale to the angles of the square formed by the entire interior, the system of the intersection of a sphere by a prism, which Persian art had employed on a small scale for the angles of octagons produced by the artifice of trumpets; in other words, it erected at each corner a sort of console, equivalent to a triangular compartment cut into a spherical vault, and whose edges rested on the curved top of the walls or on the extradoses of the divergent arches (104, 13; 81). The m masonry was exactly that of the dome for which the pendentive served as support; but generally it was a portion of a larger form, so that the surface of the calotte did not continue its own, and that the springing of the cowering was clearly marked (104, 11,12,16,17). Note that to adapt the expedient to the case of a rectangular plan, it sufficed to transform the horizontal curve of the pendentive in a manner to produce an oval support.

Toward the end of the Byzantine period, the pendentive ceased to be a portion of a vault, becoming a corbelled mass (1 (104, 17).

In reality, when the Byzantine constructor erected the vault in courses (page 106), he did not meet with the difficulty of corbelling in the angles. To obtain a dome, it was only necessary to build on the top of the supporting enclosure the four convex panels of the cross vault, previously defined, t taking the precaution to raise it enough to make the diagonal

[illegible]

The masters in Kuhn's dynastic school, protected [illegible] [illegible] [illegible] action of the vaults affords a measure of its core functions of analysis and of combination, of manifold issues or even amplification of the diverse and of the favorable issues, and of the act of arranging ingenious equilibration of one by the other.

In the case of a tunnel vault, it freely reacted to the extreme of a framework by vertices of scaffolds across such work, supported by the internal buttresses.

In it were a or as vaults, for its compartments was arranged [illegible] of with domes, or as observed on one axis of the side aisles bordering the main aisle of S. Sophia, that of [illegible] [illegible] [illegible] (105, a).

In for the different pressures exerted by a cupola at its [illegible] [illegible] [illegible]

arch a quadrant (102, 12-14).

The manner in which the Byzantine school protected its edifices against the destructive action of the vaults affords a measure of its rare faculties of analysis and of combination; it manifests indeed an exact appreciation of the adverse and of the favorable forces, and of the art of arranging ingenious equilibration of one by the other.

In the case of a tunnel vault, it freely resorted to the expedient of a framework in the form of transverse arches spaced apart, sustained by the internal buttresses.

If it were a cross vault, for its compartments was arranged the support of wide arches, or as observed on the side of the side aisles bordering the main aisle of S. Sophia, that of t transverse tunnel vaults (105, 1).

As for the different pressures exerted by a calotte at its entire periphery, Byzantine architecture knew early how to a attain its purpose by practical means of an elegant simplicity. Instead of wasting materials, labor and space for the e erection of massive buttresses, [2] it arranged a continuous a abutment by vaults resting against the parts of the edifice adjoining the principal dome. Then it flanked the great arches supporting the shell, either by four tunnel vaults (105, 2; 91, 9,11,12,14),-- by half domes (105, 3), by two tunnel vaults on one axis and two half domes on the other (105, 4), by three half domes and one tunnel vault (91, 13,18), or finally by tunnel vaults supported by half domes (105, 6). It sometimes completed the system by erecting four small calottes in the angles of the cross thus determined, charged with equilibrating the lateral thrusts of the supporting tunnel vaults (105, 5; 91, 15,17). Thus was ensured a concentration of the loads of the dome on the springings of its pendentives, and on the four angle piers.

Note 2. The structure of S. Sophia of Constantinople comprises two powerful buttresses in each side aisle. Each is c constructed of two parallel buttresses, one of which resists the great transverse arch supporting the calotte, and the other one half the pendentive (91, 7; 95).

Still this rational and effecient system had as an auxiliary a strengthening by rings, recommended to the Byzantine con-

constructors by their excellent service in case of seismic s shocks.

In the lower part of a tunnel vault are noted courses of timbers connected by ties (100, 8). Around a cross vault and a spherical vault on pendentives was placed a wooden frame at the level of the springing or above, which was sometimes strengthened by crossing diagonal ties (100, 9,10). Likewise for the drum of a dome; it was tied by crossed or even two or three layers of timbers, which crossed the windows and prevented deformation (100, 2).

The Byzantine roof comprised a wooden framework only in the case of a wooden roof alone. When the covering was of masonry, it directly supported the tiles, which were set in mortar.

Byzantine Methods for the Construction of Vaults without Centering.

One of the most characteristic traits of Byzantine architecture is, that being careful to economize preliminary structures, required in many places by the lack of wood, it was careful and expert in constructing the masonry of vaults over spaces without the aid of centerings in carpentry. A tunnel v vault was built by the practical method of slices (104, 1-5); if a cross vault were required, it was realized by the aid of two intersecting diagonal centres, and from both were turned arches to fill the compartments, starting from the side arches; or more simply by taking the construction by slices as f for its elementary tunnel vaults (102, 9-11).

Finally, if a dome were desired; either concentric rings w were laid up, so held externally as to prevent the risk of s slipping, and the closing was completed by a cap of concrete shaped on a platform; or better, the crown was lightly bisected from the large arches enclosing the area, and it was constructed in slices with four convex components with joined edges (102, 12-14).

Chapter 5. Effect.

The interest taken by Byzantine architecture in the work of construction did not exclude an entirely oriental passion for effect.

In truth, it was long indifferent to the external appearance of the edifice, and it particularly appreciated ornamentation, especially where color was the attraction.

I. Effects of Affective Order.

It singularly estimated -- we shall verify this in examining its conception of decoration -- the impressions of an affective order.

It disdained those produced by the appearance of material greatness. Aside from S. Sophia of Constantinople (106) [1]-- a marvel of vastness -- the elaborate religious programmes of the time of Justinian only comprised very modest dimensions, producing areas of less than 21,500 sq. ft., and the churches erected after the 10 th century are astonishing by the smallness of their proportions -- such that many of the most elegant and most famous do not cover 1080 sq. ft. [2]

1. The dimensions of S. Sophia are as follows:-- length 253 ft.; width 236 ft.; clear span of dome 102 ft.; height of dome 182 ft.

Note 2. Pantocrator; 52.5 × 52.5 ft.
Eski Imaret; 36.0 × 36.0 ft.
Theotokos of S. Luke; 31.1 × 31.1 ft.
Kilisse-djami; 29.5 × 29.5 ft.
Theotokos of Salonica; 26.3 × 26.3 ft.

Note as an explanation of these small dimensions the fact, that many Byzantine sanctuaries had no other purpose than the chapels of the western churches.

On the other hand, the Byzantine school expected many advantages from an abundant and intentional lighting. In fact, a fascination resulted in the daytime from the shafts of light produced by opening numerous windows in the apexes of gables, in the curves of apses, and particularly in the walls of drums and the bases of the domes (81; 83); in the night, from a brilliant illumination of the interior by a multitude of lights, from which the immense nave took "rosy colors", according to Paul the Silent.

II. Effects of Harmonic Order.

II. Effects of Harmonic Order.

For the mind was provided the satisfaction of observing the success of the realization of the programme and its adaptation to the purpose; the elegance of the solution found for the problems of construction, the propriety of the proportions, generally regulated by arithmetical combinations and by geometrical constructions (107).

III. Effects of Monumental Relief.

The Byzantine conception of monumental relief appears quite differently, according to whether the edifices considered belong to the first phase of the activity of the school, or to the later ones.

The most beautiful churches of the 6 th century -- including that of S. Sophia of Constantinople -- externally presented the ungraceful mass of a cube surmounted at its centre by a depressed calotte (108, 1).

An evolution was commenced after the 6 th century, but its completion was delayed till the 11 th, and had Greece as its principal stage, established a model, happier because organic, indicating both the arrangement of the edifice and its construction (108, 2; 86).

Indeed, above a cubical block, announced by the ground plan, the lower story of the edifice and the elevations of the side aisles, emerged four rectangular masses in cross form and ending in ridges or rounded forms, which indicated the great tunnel vaults, and these abutted against the dome; at their intersection and revealing the central square of the nave rose a cube, surmounted by a polygonal drum crowned by a dome; sometimes in the reentrant angles formed by the crossing of the arms swelled the hemispheres of the secondary domes. From that shape resulted a slenderness, further accented by the usual decoration of the dome by the arches of the drum, and the tone of verticality arising from the angles of the latter, or against the engaged columns set around its circumference.

A parallel evolution developed in the interior both a rising charm and an appearance of vastness by the openings in the piers of the square, and even by the assignment of their functions to columns (97); by the suppression of the screens, which at first filled the great arches; by the increased height

of the drums; thanks to this, the Byzantine churches of the second and third periods appear much larger than they really are.[1]

Note 1. To these innovations alludes Constantine Porphyrygenetos, when he insists on the "novelty" of the productions of the Byzantine renaissance after the 9 th century, boasting of their "grace, charm and elegance".

At the same time, the Byzantine school sought to emphasize the mural surfaces by a system of arcades and particularly of flat recesses, whose application was particularly happy in Greece and at Salonica (92; 108, 2).

It further derived attractive effects from a division of t the windows into two or three openings, separated by small columns (86; 89).

IV. Effect by the Relief of the Details.

The use of bricks and the passion for color conspired against seeking effect by relief of details. In comparison with its Hellenic and Roman ancestors, monumental relief sculpture as practised by the Byzantines appears mean and degenerate; its p productions are at a smaller scale. In particular, its profiles are poor, angular, frequently reduced to rudimentary variation of a chamfer; even still more simply, to an arrangement of the masonry, such as that of a course of bricks set diagonally and projecting in saw teeth.

In that respect the shape of the isolated support is significant.[2]

Note 2. For the shape of the pier, see page 153.

When it is conceived according to the Greco-Roman orders, the Byzantine capital does not comprise strong ideas. Instead of ample and elastic volutes, large, flexible and thick l leaves, it only puts forth lean scrolls, short, narrow, stiff and serrate acanthus leaves (110, 1). That sort of atrophy disfigures the imitation of the Composite Roman type exhibited by the edifices of the second half of the 5 th century and those of the 6 th; it is further aggravated by unfortunate m modifications, such as replacing the crown of eggs between t the volutes by small acanthus foliage and the modeling of a thick torus at the bottom of the bell (110, 3).

Completed, the relief of the Byzantine capital excludes all

appearance of a bouquet and all expansion. The effect produced is sometimes that of the lower half of a sphere or of the frustum of an inverted cone, laterall: cut into four vertical planes (110, 5); sometimes that of a conical solid accented by plaits (110, 2); occasionally being quite simple, with that of an inverted frustum of a pyramid (110, 5). The last form is normal for the impost block (98; 109; 110, 3,4); in brief, the simplicity of structural form.

For the relief, Byzantine art resorts to work, not of sculpture, but of sunken ground and of incisions in the Syrian style (page 67), producing decorative effects, but not sculpture (page 174).

172 Effects of Ornamentation.

Indeed the latter were much preferred, and were further lavished with a liberality and in a taste, that manifests the close relationship of Byzantine esthetics with that of the East.

Effects of Materials.

The largest part was assigned in consecutive aspects to the beauty or the rarity of the materials. Stuccos executed and applied with the hand of a master; marbles split into blocks, little cubes or thin slabs, and in both cases perfectly polished; precious metals hammered into sheets; ivories, mother of pearl and fine stones, employed as incrustations; all utilizable splendor was placed under contribution for the preparation of columns, wainscotings, pavements, and the facings of vaults. Particularly, an enormous use was made of enamels in the form of paste cubes of glass colored by metallic oxides, 173 or of cubes, whose apparent surface was doubled by gold or s silver leaf beneath a thin covering of glass. Both were fixed to the structure by setting them in a stucco made of several layers of cement, whose surface was of very fine texture. The reflections from these facings and these mosaics in the case of a magnificent programme -- like that of S. Sophia of Constantinople or those of many palaces -- were fascinating, under certain lights producing the appearance of construction in luminous materials.

Effects of Polychromy.

Yet, as much if not more than magnificence, Byzantium was

passionately fond of polychromy. Of colored marbles it loved to make columns, and it freely enjoyed contrasts of colors. [1] Its marble facings were mottled marquteries producing rich h harmonies, exalted by bold contrasts. [2] their effect was broad and powerful, and it was completed by the gleam of gold a and by the warm and iridescent diversity of the mosaics.

Note 1. At S. Sophia of Constantinople, the columns of the ground story were of verd antique (green) marble, and those of the gallery were of red porphyry.

Note 2. For example, see the marquetries of the Basilica of Parenzo (Volume III).

The programme was modest; according to the taste prevailing after the 14 th century, it comprised the search for ornaments for the exterior of the monument, and an elementary polychromy was realized by tinting the mortar of the beds and joints of the masonry, or more simply by shading them by the a artifice of sinking them behind the face of the masonry; it made use of the variety of tints of which bricks are capable, according to the material and burning; notably for arches combining alternations of bricks and stones; sometimes even incrusting with faience slabs.

Rich in strong tones, in extended scales, in simple and strong harmonies, Byzantine polychromy was singularly effective; further being controlled by a profound knowledge of esthetic requirements, by a very pure feeling for propriety, for unity of appearance and for monumental effect.

Effects of Relief Ornamentation.

The relief element of the ornamentation of a Byzantine edifice consisted in a profusion of flat sculptures, obtained by sunken grounds, engraving, cutting out, perforating or removing the material. It developed on the walls, friezes, panels and enclosures of polychrome paintings; around arches and on their soffits, ribbons and cords; on the balustrades of galleries and the surfaces of the iconostases, embroideries and openings, the whole being marvellously wrought (82; 83; 84; 109; 111).

Technics as skilful as patient, often with marvellous talent fashioned laces, trimmings, quipures and goldsmith's work in marbel or in stucco. But the result was not in proportion

to the effort. The lack of projection, excess of details, m minuteness of the work, the cold clarity of a work very often mechanical, caused an impression, frequently painful, of confusion, heaviness, monotony and dryness.

Effects by Drawing and Color.

Indeed, in the matter of decoration, Byzantine architecture preferred that, whose elements were furnished by design and color. It created varied, simple or very diversified appearances, often as happy as appropriate, by introducing into brick masonry several ways of arranging the materials (90; 92); by imposing on marbles, metals and precious materials, of which its facings were made, selected forms and by combining w with them marquetries more or less complicated; by developing frescos on the stucco on the masonry, a practice made general after the 13 th century by the diminution of resources (116); particularly by obtaining from mosaics of marbles and enamels, treated in masterly fashion, effects similar to those of paintings (81; 114; 115).

Motives.

From the beginning and still more after was developed in t the 9 th century the influence of the East, Byzantine decoration was chiefly ornamental, sustained by motives of geometrical order, such as scholls, interlacings, rosettes and stars (82; 83, 84; 109; 111; 112).

Yet it was pleased to represent flowers, birds, landscapes, genre scenes -- hunts, circus games -- and historical scenes; and these not only in secular edifices, [1] but also in churches; to the point that in the time of the proscription of images by the Iconoclasts, the temples presented the appearance of "gardens and avaries," to employ the terms of a contemporaneous critic! (114).

Note 1. See the descriptions of the imperial palaces.

Yet the ornamentation of the Byzantine sanctuaries was thoroughly edifying, being regulated by ecclesiastical authority and fixed in formulas. These were two in number, the first being determined by the radiation of the types and themes adopted in Palestine in the 4 th and 5 th centuries; the second was demanded in the 11 th century by the weakening of the artistic spirit, which followed the restoration of images at t

the middle of the 9 th century.

The sacred repertory, besides symbolical figures like the lamb, dove, peacock, the throne occupied by Christ at the Last Judgment (Hetimasie), comprised images of the Saviour, the Virgin, archangels, apostles, saints, martyrs and doctors of the Church; a small number of the stories of the Old Testamenent (Sacrifice by Abraham, Daniel in the den of lions, the children in the furnace etc.); a cycle of episodes taken from the Evangelists, of which those most frequently treated were the Crucifixion, Resurrection, and Death of the Virgin (Dormition); finally, mystical subjects, such as the "Divine Liturgy", otherwise called the celebration of the Holy Sacrifice by Jesus, assisted by angels, etc. (115; 116).

From the 10 th century, a relation was established between the themes and the different parts of the sanctuary, which w were each provided with a mystical purpose, in accordance with the general idea, that the "church is heaven on earth". Thus the blue with golden stars and the mosaics disappeared, at the centre of the dome was a figure of the all powerful Christ (Pantocrator); lower were those of archangels forming a guard of honor, near the base being those of apostles and prophets (114); in the dome of the apse was an image of the Virgin glorified or praying; then again around the sanctuary, the mystery accomplished there was recalled by figures of the high priests of the ancient law, by representations of the L Last Supper or of the "Divine Liturgy".

Style.

The style of this ornamentation reveals the conflict of two forces; on the one hand, of Hellenic traditions, maintained by the exhibition of antique masterpieces collected at Constantinople, and confirmed by the renaissance of the 10 th century, on the other, the energetic influence of the hieratic tastes of the Church and of the orientalizing tendencies of Byzantine civilization.

According as one or the other triumphed -- from the 11 th century the second was the rule [1] -- we find reason to admire the character, expression, beauty and rythm, or to regret the impersonality, uniformity, lack of spirit and an equally disagreeable stiffness. In a general way, the dominating trait

the Byzantine ornamentation is an extreme conventionalization.
1. In the 14 th century was a tendency to revive the art by s seeking for life, picturesque and pathetic subjects.

Byzantine mural painting possessed in the highest degree t the feeling for monumental effect. As careful for the unity of the entire appearance, and the clarity of the particular aspects, for morally impressing the observer and his esthetic pleasure, it knew how to avoid minuteness in drawing, refinements in modeling, vivacity in expression, precision in perspective, and hues of color. Energetic, often almost brutal, with animated drawing, it detached the outlines and omitted details. It admitted only grave faces, rare gestures, calm attitudes and processional groups. Its palette was only charged with a small number of fresh tints, chosen from strong t tones and boldly contrasted. Particularly it watched over w what there was of gravity and discipline, order and hierarchy in the arrangement of the themes, simplicity in composition, symmetrical regularity of arrangement and harmonies of the e elements.

On the whole, it impressed on its works a stamp of noble m magnificence, sacred majesty, and also frequently of ideal s solemnity.

Book III. Eclectic Architecture of the Mohammedan Civilizations.

The domain of the Mohammedan styles of architecture is the most vast, and its career is one of the longest known to history. The former comprises all Asia, from the west of the Pamir and the Gulf of Bengal to the south of the Black Sea; from the Caspian Sea and the Sea of Aral; northern Africa from the Red Sea to the Atlantic; Spanish, Sicilian and Balkan Europe. The latter commenced at the beginning of the second t third of the 12 th century and still endures, although there has been a stagnatio for two centuries. [1]

Note 1. The works of Mohammedan architecture are still very badly known. The fault is due, both to the ruin of a multitude of its productions, and to the rarity of scientific r researches.

Chapter 1. Requirements. -- Monumental Chronology and Topography.

I. Requirements.

The vast countries, that the "holy war" gave up to the disciples of Mohammed, comprised the wealthiest and most civilized regions of the ancient world. Galvanized by the ardor of the conquerors, favored by a wise administration, they enjoyed a rare prosperity. Galiphs were in possession of enormous revenues and absolute power; governors were provided with an authority and with revenues almost royal; an ostentatious nobility was assured by conquest and largely endowed by the sovereigns; a citizen class was enriched by industry and commerce. Singularly, active and extremely lavish in constructions. Indeed numerous as well as energetic were the causes of the demands; division of the Mohammedan area into a great number of states, whose chiefs were rivals in luxury, and often in zeal for the public welfare; the frequency of revolutions in the palaces, and of usurpations, from which resulted many creations of capitals; coexistence among orientals of a horror of inherited dwellings, of entire carelessness in the care of m maintenance, the weariness advising changes of residence; a very developed care for the tomb; the inclination of the Mohammedans for pious works (fountains, baths, caravanserais, (khans) and hospitals (moristans); finally the religious fer-

fervor, the cause of the incessant demand for ordinary mosqw-es, for cathedral or "Friday" mosques (djouma), for reliquary mosques (quoubbet), of seminaries (medresse) and of monasteries.

II. Monumental Chronology and Topography.

1. From the Hegira until the Middle of the 8 th Century.

The expansion of Islam directly benefited architecture. F Five years after the death of the prophet, the invasion of M Mesopotamia caused the founding of two cities, whose growth was necessarily rapid and fortunate; Bassora on the Euphrates and Koufa south of Babylon. (637). One of the fisst consequences of the conquest of Egypt by Amrou was the creation in 641 of a new capital, Foitat, on the eastern bank of the Nile and opposite the great pyramids, and the erection at the same place in 642, of a mosque designated by the name of the conqueror. Finally in 643, the occupation of Jerusalem occasioned the erection on the site of the Temple, of a "Mosque of the Rock" (Quoubbet-es-Sakhra).

After 660 and during three quarters of a century, architecture was much occupied in Syria, because Moawiah, the revolted governor of the country and his descendants, the Ommiade caliphs, were both passionate for luxury and interested in p possessing in their domains a holy city in opposition to Mecca. It notably had a mission to construct richly decorated castles, like that of Kusejr Amra on the borders of the desert and east of the Dead Sea; to make of Damascus a splendid city, endowing it with a great mosque paid for by the caliph Walid (707); to build at Jerusalem at the expense of Abd-el-Malek a mosque called El Aksa (685). These princes likewise required, the former the rebuilding of the Mosque of Medina, the latter, that of Mecca.

Finally, the submission of northern Africa to the law of Islam determined about 670 the foundgin of Kairouan in Tunisia, and the erection of a mosque in that city, whose name -- Sidi Okba -- commemmorates the victorious general. Sixty years later was built at Tunis the Mosque Djami Zitouma.(732).

2. From the Middle of the 8 th century to the Middle of t the 9 th.

In any case, not before the middle of the 8 th century did
183 Mohammedan civilization request the services of the art of b building in the measure necessary for the progress of the fo-

former.

First, there were two wings of the Mohammedan world.

The establishment of the dynasty of the Abbassides in Mesopotamia (748) inaugurated there an age of abundant demands, varied and magnificent, whose results we are unfortunately p prevented from appreciating, by the fault of the Mongols and also because of insufficient explorations. At least we know that mad with luxury, encumbered with wealth and also endowed with artistic feeling, Mansour (754-775), Mehdi (775-785), Haroun-er-Raschid (786-809), Mamoun (812-833), Mohassin (833-841) and Motowakel (847-861) placed themselves in the front rank of building sovereigns, and that masterpieces were multiplied by the construction of two great capitals, Bagdad (757) [1] and Samarra (842); [2] splendid pacales like that of Er-Raschid at Rakka (790); mosques, such as those of Bagdad (760) and of Samarra; tanks like those of Mousa-el-Kazam at Kazamein near B Bagdad (801), and that of the empress Zobeideh in the latter city (831).

Note 1. Ruined in 1250 by Houlagou.

Note 2. Abandoned in 876.

In the same epoch and under the same impulse arose in Persia some important mosques -- Mosque Djouma at Ispahan (760-770), Mosque of Kazvine (786) -- and entire cities, like that of K Kachan, created in 800.

On the other hand in Spain, the foundation in 755 of the dynasty of the Ommiades of Andalusia opened an epoch of marvellous prosperity and of refined civilization. Thanks to the zeal of Abd-Er-Rahman I (755-688) and of Abd-Er.Rahman II (822-852), Cordova was filled with edifices, among which a g great Mosque, built from 785 to 788, was much enlarged and embellished from 833 to 848.

Finally, the erection of Maghreeb-al-Acsa or Morocco into an independent state under the dynasty of the Edressites (789) caused at the beginning of the 9 th century the creation of a capital, Fez (806), which thirty four years later was enriched by a beautiful Mosque, named Karouyin, and toward the m middle of the century, it received fhom Yahia-ben-Mohammed s some important embellishments.

3. From the Middle of the 9 th to the Decline of the 10 th Century.

From the middle of the 9 th century to the decline of the 10 century, Mohammedan architecture passed through a period of less activity; it felt the difficulties that the weakening of the Abbasside caliphate raised in Mesopotamia, [1] and outside Asia its field was reduced to two regions, which were in the second half of the 9 th century, Egypt, and in the 10 th, Spain and Morocco.

Note 1. Note to the credit of that epoch the erection of the Mosque of Chiraz (875) and the monuments destroyed by the Mongol invasion, at Bokhara "the Noble", which under the Samanides (875-1004) was a religious and industrial metropolis.

In the former of these countries, the successful revolt of the emir Ahmed-ibn-Touloun (869) caused the construction beside Fostat, of a royal quarter, El Katai, with a sumptuous p Palace and a great Mosque (876-878). Khumaraweyh (883-896) actively continued the work by extending the programmes. [2]

Note 2. Excepting the Mosque, the monuments of El Katai w were destroyed in 905 by an Abasside army.

In Spain, Cordova under Abd-er-Rahman III became a marwellous city, the "pearl of the world" in the eyes of the semi-barbarians of Europe. Near it was produced in 936 by a caprice of the sovereign the famous "Palace of the Flower" (Medinet-es-Zahra), almost as great as a city. [1] Hakem II (961-976) c continued the work of the Great Mosque, which he enlarged by more than half and enriched by a splendid mirhab (961-965).

Note 1. It was destroyed in 1010.

In Morocco were created several cities; Sedrata (909) by t founder of a little Berber State; Makdia in Tunisia (912-918) by Abou-Obeidollah, founder of the line of the Fatimites; Algiers (944).

Finally for Sicily, conquered by the Mohammedans of Morocco during the last two-thirds of the 9 th century, the second h half of the succeeding century was an epoch of material prosperity and artistic flourising. Doubtless it is necessary to see in the Cuba and the Ziza Palaces, Arab edifices of that epoch, restored by the Normans at the middle of the 12 th century.

IV. Last Third of the 10 th century.-- 11 th century.

After the 8 th decade of the 10 th century occurred a marked

increase of the demands.

Thanks to the wise government and the artistic tastes of t the Fatimite caliphs, to whom Egypt found itself subject after 969, a great field remained open on the banks of the Nile, from that date until the decline of the 11 th century.

There came from it a new capital, El Kahira (Cairo; 969) w with a "Mosque of the Flower" (Gamia-el-azhar; 973); a magnificent Palace, a family Mausoleum, al ordered by El Moizz (d. 975), the founder of the dynasty. Then arose on account of El Aziz (975-996) a fairy Palace and a Mosque, which was founded in 990 and bears the name of the prince El Hakem (996-1021), who completed it in 1012; two Mosques, contemporary with the reign of El Mostanser (1036-1096), Talai-abou-Rezzik (begun in 1060) and El Giyouchi, the fortifications of Cairo, executed in 1060, are recalled by three grand gateways; Bab-el-Foutouh, Bab-en-Nasr and Bab-Zoueile.

On the other hand in Asia, architecture benefited by the e extension of the Fatimites into Syria -- the Great Mosque of Aleppo (976); by the impetus of the empire of the Ghaznevides in central Asia -- the Great Mosque of Ardebil in Persia (1017), and magnificent monuments of Ghazna in Afghanistan under the reign of Mahmoud I (999-1030), the great conqueror of India; finally by the fortunes of the Seldjouk Turks -- Mosque of Ani in Armenia (end of 11 th century).

Building was no more idle in Morocco by reason of a division of the country into principilaties, which required capitals -- Kalaa of Beni-Hammad (1007), a great Mosque at Algiers (1018), religious and secular edifices (famous Palace of the Pearl) at Bougie (1068); and also in consequence of the establishment of the Almoravides in Morocco -- the creation of Marrakech (1062), the embellishment of Fez (1069), and the construction of the city of Taggart at Tlemcen (end of the century).

Finally in Spain, a last extension, due to Al Mansour, possessor of the power under Hischam II (976-1002), completed the Mosque of Cordova, while there was built that of the Aljaferia at Saragossa.

5. 12 th Century.

In the course of the 12 th century, it was only in the western wing of the Mohammedan world, that architecture was the

[illegible] of [illegible] pressed [illegible].

In [illegible], the [illegible] of the [illegible] Dynasty; in Syria, the [illegible] of the [illegible] and the [illegible] [illegible] [illegible] were not calculated to [illegible] [illegible] [illegible] [illegible] of Kom-el-Ahmar and of [illegible] [illegible] [illegible] [illegible]

188 object of rather pressing demands.

In Egypt, the fall of the Fatimite dynasty; in Syria, the establishment of the Seldjouks and the struggles against the Crusades (2 nd crusade) were not calculated to favor sumptuary demands; the undertakings of Nour-ed-Din and of Saladin w were essentially of a military type -- Citadels of Damascus, of Aleppo (1160) and of Cairo; the enclosing walls of the last city (1176).

On the account of Asia, held by the Turks, we shall mention the great Mosque of Mossoul (1150-1191); some monuments at M Merv, which was at its climax in the reign of Sultan Sandjar (1117-1157); Great Mosque and Mausoleum of Sandjar; also in the capital of the Seldjouk sultanate of Konieh, a Mosque (about 1150) and a Palace (1160-1190).

On the contrary, the impulses of the Almoravide empire in Morocco and in Spain were favorable to the art of building, whose production in those countries is marked by the fortifications of Marrakech (1107); the great Mosque of Tlemcen (1135 -1138); that of Seville (1171-1178), of which remains no more than the minaret, the famous Giralda (1194-1196); the first Alcazar of the same city (1181); the Morocco cities of Rabat and of Chella (1178); the Koutoubia of Marrakech (1184).

6. 13 th Century.

Inversely, during the first half of the 13 th century, architecture prospered only in Asia Minor aud in India. In Spain, it suffered from the rapid decadence of the Moorish empire in the course of the second third of the century. [1] In Morocco, it was but little occupied -- the Kasba of Tunis and Mosque of Abou Zakaria in the same city; in Egypt not more -- Palace of Sultan El Kamil at Cairo (1218-1238). In the first half of the century, central Asia was ravaged by the Mongol invasion. Note however, some Mesopotamian buildings, at Bagdad b being the Medresse of Mostanser (1232); at Mossoul, the structures of the Atabeg Bedr-ed-din-Loulou (1218-1259).

On the contrary, the art of building profited by the economic and political impulse of the Seldjouk sultanate of Konieh and by the important theoligocal movement, of which the capital was then the theatre. In effect were demanded from it m mosques (for Konieh -- Great Mosque (1220), Mosque of Sahiba-

Sahibata or Energhe-djami (1260), of Djelal-ed-Din (1273); f for Divrigui (1228); several medresses (for Konieh -- Sirtcheli (1242), Indje-Minareli (1251), Karatai (1251); for Siwas-Gueuk Medresse (1270); fortifications -: citadel of Konieh ((1223); finally, magnificent caravanserais -- Ak Khan at Gonjarli (1200-1250), Sultan Khan near Konieh (1229-1278).

On the other hand, the establishment at the beginning of t the 13 th century of the great Ghouride or Pathan empire in the western half of northern India opened to architecture a new and wide career, illustrated by monuments like the Mosque of Koutab at Delhi (1196-1235), that of Ajmir (1200-1235), a and the Tomb of the emperor Altamsch (died 1235) at Delhi.

Finally, in the decline of the century, Persia realized in consequence of an economic rise of the country and of conversion to Mohammedanism of the dynasty imposed upon it by the Mongols, the conditions of a resumption corresponding to the demands -- Mosque of Ghazan-Khan at Tauris (1294).

On its part, Africa did not remain inactive. Morocco was dominated after 1275 by the dynasty of the Merinides, who continued to build -- the creation of Mekines (1275), embellishment of Fez (1286) and the erection of the Mosque Sidi ben H Hassan at Tlemcen (1296).

Particularly, the fortunate condition of Egypt under the g government of Turkish mamelukes, established in 1250, enabled the sultans, as well as their emirs, to satisfy at pleasure a foolish passion for luxury and show. The remembrance of it is preserved by the ruins of the Mosque of Sultan Bibars (1267-1269); by the Moristan of Sultan Kaloun, a fine group of Hospital, Mausoleum and Mosque (1285-1293); and by a Medresse a and a Mausoleum devised for sultan El Naser (1299).

7. 14 th and 15 th Centuries.

With the 14 th century commences for Mohammedan architecture an epoch of marvellous prosperity, that must have lasted for two centuries. In the entire extent of its domain was proposed a multitude of programmes, varied and magnificent.

Under the Bahrite mamelukes, and after 1382 under those of the Gherkesse or Bordjite dynasty, especially in the two last thirds of the dynasty, Cairo was enriched by numerous edifices for various purposes, among which are distinguished; the

Mosque Nesfi Keissoun (1308); that of sultan En Nasr (1317); the Palace of the emir Bechtak (1330); the Mosque of emir El Mordani (1338-1340), the Mosque and Monastery of emir Cheikhou (1350-1355); the very remarkable one of sultan Hassan (1356-1359); the equally interesting Medresse of sultan Barkouk(1382-1399), and his very beautiful funerary Mosque in the cemetery of the caliphs. (1393-1410).

The contemporary production of Morocco and of Spain was relatively considerable. Tlemcen had become the capital of the Abd-el-Wadites and was the scene of great undertakings; the construction of Mansoureh by Yacoub-en-naser (1290-1302); Mosques of Mechouar and of Sidi-Brahim (1318), of Sidi-ben-Medine (1338) and of Sidi-el-Haloui (1353); rebuiling of Mansourah (1336-1344)a There ware also works at Algiers; Minaret of Djami Kebira (1323); at Marrakech (1331); at Fez (Medresse B Bouanania (1355); and at Tunis.

As for Spain, this was the epoch in which was carried on t the realization of the Alhambra at Granada, so prosperous under the Nasride princes; the enclosing walls and Palace of Comares by Yousouf I (1333-1354); Court of the Lions, Hall of Ambassadors, the Machuca quarter, by Mohammed V (1354-1391); Cabinet of the Infantes by Mohammed VII (1392-1408).

The work of Asia is no less imposing. Persia distinguished itself by monuments entirely worthy of attention -- funerary Mosque of Oldjaitou Khodabendeh at Sultanieh (1320); Mosques of Marad (1316), Veramine (1322), Amol (1379), Hamadan, Bostam and Asbistan.

The establishment of the seat of the empire of Timour (Tamerlane) at Samarcand in the decline of the century gained for architecture a new domain; Tomb of Tchouchouk Bika (1371); Mosques of Bibi-hamyn (1389-1403) and of Chah Sindeh (1392-1434), etc.

Meanwhile the art of building had yet greater reason to pride itself on the progress of Islam in India (construction of the new Delhi (Tughlaquabad, 1321); the great Mosques of Cambhay or Kambat (1325) and of Dholka (1333) in Guzerat; Mosques of Adinah at Gaur, capital of Bengal (1358-1389), of Barbak at Jaunpore (1377), of Kalan at Delhi (1387), and of Kulbarga in Deccan (2 nd half of the century).

It benefited no less by the success of the Osmanli Turks in western Asia Minor and in the Balkan peninsula. As soon as taken by Orkhan (1326), Broussa was provided with mosques, p palaces and various buildings, and its embellishment continued during the course of the entire century -- Mosque and Palace of Mourad I (1357), Great Mosque (1379-1414); Baths of E Eski-Kaplida (1389); Hospital (1394) etc. On their part, Kutayeh and Nicea were supplied, the former with a Mosque and a Medresse (1378); the second with a Mosque, "Green" (1379) etc. Finally, the conquest of Adrianople by Mourad I (1360) introduced Mohammedan architecture into southern Europe.

During the 15 th century occurred a decadence in Morocco and in Spain, and the efforts of Persia were mediocre -- Great Mosque of Tauris (1403-1448), Mosque of Mir Bouzourk at A Amol and of Riza at Meched. But by the rise of Turkestan under the Timourides -- Tomb of Tamerlane (Gour Emir, 1405) and Medresse of Ouloug Bey at Samarcand, ruined monuments at Bokhara and at Merv; by the expansion of the Turks in western Asia and in Europe, the subdivision of India into numerous states competing in monumental luxury; finally, by the continuance in Egypt of the favorable conditions previously mentioned, the Mohammedan demands were maintained at a level near t that first noted.

Thus Cairo was enriched by a multitude of beautiful edifices; Mosque of El Mouiyad or El Ahmar (1414-1422); Mausoleum, funerary Mosque and Monastery of Bars Bey (1432); monuments, magnificent as well as numerous, were realized under the reign of Kait Bey (1468-1496), notably the funerary group (Mausoleum, Mosque, School, Monastery and Fountain) erected by that prince (1472-1496); Tomb of Emir Yachbak (1470-1480); Mosques of Esbek (1495-1500); of El Ghouri (1500) etc.

Greater was the Turkish demand, especially after the conquest of Constantinople (1453). Its memory is preserved at Broussa by the "Green" Mosque (1415-1424), the Tomb of Mahomet I ("Green Turbe"; 1420); the group of Tomb, Mosque and Medresse of Mourad II (died 1451); at Konieh by the Mausoleum of M Mohammed Bey (1421) and by the fortress; at Kutayeh by the M Mosque of Yacoub Tchelebi (1433); at Adrianople by the Mosques of Mahomet I (1420), of Bokharia (1453), Eski Djami (1468),

Bayazid (1484), by caravanserais and fortifications (1497-1500); at constantinople by the Mosques of Eyoub, of Mahomet II (1463), Daoud Pacha (1484), Bayazid (1497-1504), the Old Seraglio and the Baths of Mahomet II etc.

Finally, India did not remain behind, thanks to the undert-
194 akings, frequently magnificent, op the sovereigns of Jaunpore--
Mosque of Atala (completed in 1408), Great Mosque (1438-1478) in the capital of the same name in their state; those of Malwa, whose capital, Mandu, was founded in 1401, and was rapidly enriched by palaces and mosques (the most important being finished in 1434); of the princes of Bengal, who multiplied at Gaur and at Malda useful and sumptuary works (1414-1445); of the masters of Guzerat -- construction of Ahmedabad (after 1411), funerary monuments of Sarkheje (1446-1451), Tomb of M Mabarak Sayyd near Mahmudabad (1484), Great Mosque of Champanir (southwest of Ahmedabad) (1484-1508), Mosque of Muhafiz Khan at Ahmedabad (1492), Mosque of the Queen at Mirzapore; of the Bahmani dynasty in Deccan, which transferred its capital from Kalberga to Bidar (1426), where it was lavish with splendid edifices (Medresse of Mahmoud Garvan, completed in 1480).

8. First half of 16 th Century.

During about fifty years, corresponding to the first half of the 16 th century, this fever for building appears to have subsided.

The conquest of Egypt by the Turks (1512) caused the loss of one of itr best patrons to Mohammedan architecture.

Disturbed by the invarion of "Mongol" bands, who under the lead of Baber founded the Mogul empire, or that of the Grand Moguls at the expense of the Pathan dynasty (1526), southern India figures in our representation by only a small number of monuments: the Mosque of the Citadel of Delhi (1541); Tomb of Sher Shah (died 1545) at Sahsaram etc.

In Persia the work of national reconstruction, commenced by Ismael Sefi (1501-1523) could scarcely comprise sumptuary enterprises. For this time, we can only cite the construction at Ardebil of the Mosque of Sheik Sefi and of the Palace of Osman Khan.

The Turkish demand alone continued relatively important, m

maintained by the spirit of conquest and the zeal of Bajazet II (1481-1512), of Selim I (1512-1520), and of Siliman II the Magnificent (1520-1566); witness at Constantinople the Mosques of Shah-Zadeh (completed in 1545), of Selim I (1520-1556), and of Roustem Pasha; at Scutari, that of Inkelessi Buyuk; at Angora, those of Hadj-Beiram and of Ahmed Pasha; at Broussa, the Baths of Yeni Kaplidja; at Konieh, the Fountain of sultan Selim (1520), at Siwas, the Tomb of Bayezid; at Damascus the Sulemie Hospital and Monastery (1515), at Jerusalem, fortifications (Gate of Damascus; 1537) etc.

9. Second Half of the 16 th Century and First two-thirds of the 17 th.

The middle of the 16 th century and the decline of the 17 th limit one of the brilliant phases of the history of Mohammedan architectural styles, otherwise peculiar to the Ottoman empire, Peesia and the India of the Great Moguls.

Always persistent, the first multiplied edifices for all p purposes on the account of sultans, pashas and citizens. Among them we name; at Constantinople; the Mosques Sulemanie ((1577), of Ahmed I (1609-1614), of Sultana Valide (Yeni Djami; 1650), Turbe of Selim II, the Valide Khan (1650), the New Seraglio (1644) etc.; at Scutari, the Mosques of Ayasma, of Djahanguir (1566), Valide Djami (1650) etc.; at Adrianople, the Mosques Sulemanie (1570) and of Mourad IV (1628); at Nigde in Asia Minor, the Tomb and Mosque of Fatma Khatoun, daughter of Ahmed I (1619); at Bagdad, the Mosque of Sheik Omar (1638) etc.

In Persia, the accession of Shah Abbas I (1585-1629) inaugurated an epoch of magnificent prosperity for the country in general and for architecture in particular. Tauris and Kazvine were raised from their ruins. Ispahan was chosen as capital, and was decorated by one of the most beautiful monumental arrangements in the world; a vast square bounded by a great mosque and by bazaars -- the Meidan-i-Shah, different edifices and admirable promenades -- alleys and pavilions of T Tchar Bey. Let us cite further sumptuous palaces, such as t that of Ali-Kapou at Ispahan (end of the 16 th century); that of Achref in the Mazenderan (1613-1627). In 1647, Ispahan w was enriched by a beautiful Mosque named Loutif Oullah; in 1 1666 by a monumental Bridge, called Rokn-ed-din.

Also for Turkestan, the end of the 16 th century and the b beginning of the 17 th were a time of prosperity and of embellishment: witness at Samarcand on the market-place (Reghistan), the Mosques of Schir-Dar (1616) and of Tilla Kari (1618); at Bokhara, mosques and medresses.

In no country and in no epoch was Mohammedan architecture more favored, than in the India of the Great Moguls from the middle of the 16 th century to the decline of the 17 th.

Akbar the Great, whose long reign (1556-1605) was one of t the best recorded in history, had in a rare degree the taste for building and a passion for the beautiful. The measure of both is given by a Tomb of the emperor Humayun at Delhi (beginning of the reign); by a multitude of edifices at Agra, in the number of which are notably the Old or Red Palace; by splendid monuments at Fathpur Sikri, the favorite residence of the sovereign -- among which is one of the most beautiful Mosques of India (completed in 1575); by a citadel and Palace at Ahmedabad (1572); by the Tomb of the prince at Sikandam etc.

Under Jehangir (1605-1628) the demand was less -- Palace a and Tomb of Itamad-d-Daulah at Agra; Palace of Lahore; new c city of Dacca in Bengal. But thanks to Shah Jehan (1628-1 1658), one of the most enthusiastic builders, that ever existed, it became more beautiful; great palaces at Agra (1638-1648) and at Delhi; mosques at Agra -- "Mosque of the Pearl" or Moti Musjid (1645-1653); at Delhi -- cathedral Mosque (1644-1658), Mosque of Jehan Ara Begam (1644-1648); Tomb of the empress Monntaz at Agra -- the famous Taj Mahal, one of the masterpieces of funerary architecture (1630-1647).

Yet this magnificent effort should not eclipse that of the princes of Golconda, recalled by remarkable mausoleums erected at the beginning of the 17 th century, still less that of Ali-Adil-shah and of his successors on the throne of Bijapore, attested by a great Mosque (1557-1579), numerous palaces and mansions (Gagan Mahall; 1651), monumental tombs, like those of Ibrahim II (1579-1626), of Mahmoud (1626-1660) etc.

For the same epoch, we have said that the production of the remainder of the Mohammedan world was very small. Egypt contributed to this by the erection at Cairo of the Tomb and Medresse of El Ghouri (1501), of the pretty Mosque of El Bordeini

(1628) and that of Ibrahim Aga (1652); Morocco, by the construction at Tunis of the Abdelliah (1523) and of the Mosque of Hamoud Pasha (1631-1664), at Algiers, the Palace of Janina ((1634), of theMosque of the Fishery (1660), various monuments at Marrakech -- Palece El Bedi etc.

10. From the Decline of the 17 th century.

From the decline of the 17 th century, the Mohammedan world built less and less.

In the Ottoman countries, the demands were scattered and d diminished in importance. Note the erection at Adrianople of a Palace (1676); at Constantinople a New Seraglio (1669), Palace of Sweet Waters of Europe (1718), new Palace of Unkiar S Skelessi (1748); rare Mosques -- Nour-i-Osmanie (1748-1755); of an aqueduct under Mahmoud I etc.

Under Aurengzebe (1658-1707), the Mohammedan architetcure of India shared the decadence of the Mogul empire; yet Mosques at Benares (1669), at Lahore (1674), and Palaces at Delhi attest that it was not inactive.

Persia likewise, after Shah Abbas, passed through difficult times, felt by art. There was a resumed demand three times; under Shah Hussein (1694-1721) -- Medresse and Caravanserai Madere-i-Shah Hussein at Ispahan (finished in 1710), new Pavilion of Tchebel Soutoun (1700); under the usurper Kurde Kerim Khan (died 1779), whose installation at Shiraz in 1755 occasioned great ornamentation of that city -- Mosque Vekil; f finally under Feth Ali (1797-1834), who built at Ispahan -- Pavilion of Eight Paradises (Hecht Behicht), as well as at T Teheran, the new capital -- a great pleasure Palace called Kasri-i-Kadjar.

As for Egypt and Morocco, their contribution to the monumental treasures of Islam was very small. Yet we may cite; at Cairo, the Monastery yamed Tekki-ye-es-Soultan Mahmoud or Habbaniye (1751) and the beautiful Fountain of Sebil-Abd-er-Rahman (1759); at Algiers, the Mosque Sidi-Abd-er-Rahm (1697); at Tunis, that of Sidi Mahrez (1700), at Mekines, the Gate Bab-el-Mansour-el-Heuldj (1732) etc.

Chapter 2. Conditions and Influences. -- Schools.-- Epochs. -- Radiation.

I. Conditions and Influences.

For a long time no Mohammedan architecture existed, except in the sense that the art of the different peoples conquered by the Arabs was compelled to adapt itself to the religion, customs and tastes of the victors. In fact, since these only numbered missionaries and soldiers in their ranks, they were obliged to employ native artists, whether converted or not.[1]

Note 1. Note the tradition which attributes the construction of the Caaba at Mecca to a Copt from Alexandria, and that of the Mosques of Amrou and of Ibn Touloun at Cairo, which do equal honor to the Christians. Ibn Khaldoun writes: -- "When the Arabs had ceased to observe the strict precepts of their religion, and when the taste for a happy life and for power had seized on them, they learned from the subjugated Persians the arts and architecture". (prologomenes).

Yet it was fated, that this submission should prepare the coming of a certain esthetic fellowship among the different sections of the Mohammedan world.

And first, each one was stamped with the same mental and m
moral imprint, so strongly that after receiving this, the most widely separated peoples, the most different races, and t the most unequal civilizations found themselves related.

Besides, though not refined, the Arab leaders of the conquest -- the employers of architecture -- were not barbarians; generally being well endowed in respect to esthetics, they largely belonged to sedentary tribes, for which building was not a nowelty.[1] Thus they had preferences, whose satisfaction was everywhere marked by the same trait of native art.

Note 1. See before, Book II, Part II, Section I.

A third cause of the formation of a Mohammedan style was t the extreme facility of communication between the Mohammedan countries. It resulted from the convenience of journeys, that created a great religious and social fraternity; from the existence of a common language and from official and private arrangements in favor of travelers; finally, from an intense commercial circulation, favorable to make common the decorative forms created by the sumptuary arts.

We must again regard as favorable to a relationship of the schools, the power and despotism of the sovereigns, that permitted them to either call from afar architects and artisans, [1] or even to levy them in multitudes. [2]

Note 1. For example, note the construction of the mosques of Cairo by Persian architects, one in the decline of the 10 th century on account of a wife of the caliph El Moizz; another, that of Nefsi Keisoum (1308) by a master from Tauris, who, according to Makrisi, copied the minarets of the Mosque of A Ali-Shah in that city. Note the invitation addressed by Baber and by the Great Moguls of the 17 th century to architects of Constantinople.

Note 2. Note the Egyptian and Persian decorators, that sultan Selim II levied by hundreds for the works at Constantinople; also note the multitudes of artisans of all nationalities -- including Chinese -- that Tamerlane concentrated in Turkestan.

2. Finally must be counted as an agent of unification the prestige of Bagdad, the seat of the Abbasside caliphate, and of Damascus, capital of the Ommiade caliphate; for this subjection of the Mohammedan world to the radiation from the Perso-Mesopotamian and Syrian East. In particular, the Sassanian ornamental style was made universal by an active exportation of the products of the artistic industries of Persia. [1] It is true that in Mediterranean countries, there was competition by the Byzantine formula, that benefited by an already ancient vogue and by the fame of the mosaicists of Constantinople. [2]

Note 1. See page 205. Note 1. Likewise note the prestige of the Palce of Chosroes at Ctesiphon, an idea of which is given by the fact, that when sultan Hassan projected a mosque in Cairo (1356), he caused the height of the monument to be measured in order that his own should exceed this.

Note 2. See the entirely Byzantine sculpture of the Mosques of Jerusalem, Damascus, Kairwan etc. The mosaics of these two first cities were the work of Byzantine artisans; likewise those of the Mosque of Cordova, for the execution of which Hakem II ordered from Constantinople 320 quintals of cubes. (961).

Let us add that the comparative unity of the Mohammedan wo-

world in regard to climate facilitated the transmission of p programmes and methods from one country to another.[3]

Note 3. For the natural conditions that Mohammedan architecture found in the different provinces of its area, we ask the reader to refer to the Chapters devoted to the earlier m manifestations of artistic activity in those countries. (See Volume I, pages 25, 117, 156, 256 and 392, and in this Volume, pages 36, 70 and 294).

Certainly Mohammedan art must have been affected by the ordinary conservatism of the East, confirmed by the Mohammedan spirit, a strictly corporate organization of trades, and an ultra traditional instruction.

Yet, thanks to the impulse of progress, that produced a profusion of frequently magnificent demands, of enormous material resources, and finally the qualities of artists and of artisans inheriting the taste and experience of some of the most artistic civilizations of the world, there was accomplished in each of the great regions of the Mohammedan world a slow ripening, at the end of which blossomed a composite style, but animated, characteristic and rich in beauty.

Then in the largest measure, the development and the orientation of Mohammedan architecture found themselves dependent on conditions of the human order. To those just recognized by us it is proper to add the passion for effect, particularly in a brilliant key, which constitutes one of the characteristics of the oriental; his negligence and carelessness; his habit of only building temporary dwellings, confirmed by the fact of equal suddenness of fortune and of disgrace, peculiar to democratic societies under despotic government; finally, the requirements of sovereigns accustomed to the rapid satisfaction of their caprices.

II. Schools. -- Epochs.

In the relative unity of Cohammedan styles of architecture may be distinguished six great schools, which may be placed in two groups, each dominated by the one first mentioned:-- on the one hand being the Syrian, Egyptian, Morocco-Spanish; on the other being the Perso-Mesopotamian, Seldjouk-Ottoman-Turkish and the Indian.

The school of Syria cannot be appreciated at its value, be-

because its work for the greater part was destroyed by the r ravages of the Crusades, Turkish and Mongol invasions and the campaigns of the Mameluke sultans of Egypt, and what remains has not been studied as it merits.

Faithful to its ideal of the pagan and Christian epochs, [1] it applied itself to good construction, and preferred effect by monumental relief and polychromy of materials. It very energetically influenced Egyptian architecture after the 12 th century; that of Turkish Asia Minor in the 12 th and 13 th; in lesser measure that of Morocco before the 11 th, and that of the Ottomans in the 16 th.

Note 1. See Volume I, page 447; Volume II, page 48, 56.

On its part, it was affected by Egyptian art, at least in the details, in the 11 th century and in the 14 th and 15 th; by that of western Europe as a result of the Crusades. [1]

Note 1. See the minaret of the White Mosque at Ramleh (Palestine), called Tower of Forty Martyrs. (1318).

Not before the 15 th century did the Egyptian school attain maturity. At first, it drew from Coptic, Byzantine, Syrian and Perso-Mesopotamian sources, [2] using brick construction a and decoration by stucco and paintings. In the last year of the 12 th century, the establishment of the dynasty of the Ayoubites, originally from Syria, subjected Egypt to the artistic influence of that country; its progress was manifested in the course of the succeeding centuries by a development of stone construction, [3] and by an embellishment by means of methods of mounmental relief and of structural polychromy. In the decline of the 13 th century and in the 14 th, were added Persian influences, favored by the Asian origin of the Mamelukes; these are revealed by the adoption of a cruciform plan for the mosques and by the use of faience mosaics. In the 14 th and 15 th centuries was created a very remarkable formula, whose application was particularly happy in the domain of domestic architecture. After the 16 th century, it is complicated by some Ottoman elements, introduced with the Turkish supremacy. Inversely, Egyptian art contributed to the formation of Ottoman art.

Note 2. Note the fact, that the Mosque of Ibn Touloun at Cairo (876-878) was imitated from that of Samarra. Also that

being Shiites, the Fatimides must have had a weakness for the art of Persia, the cradle of their faith.

Note 3. The most ancient facade in stone is that of the M Mosque El Akmar. (1125).

Two schools disputed the control of Moroccan and Spanish a architecture, those of Kairuan and of Cordova.

The former, that until the 12 th century radiated over all Morocco and also over Sicily, proceeded in very large measure from Africo-Byzantine art and that of Mohammedan Asia. [1]

Note 1. Ibrahim-el-Aglab, the first Aglabite sovereign of Kairouan, imported from Bagdad faience tiles for the decoration of the Mosque of Sidi Okba.

After the 10 th century and particularly the 11 th, this d dependance was reduced by a reaction of the Berber basis of the inhabitants of northern Africa. [1]

Note 1. Note the manifestation of this reaction in the political domain, the foundation of the states of Sedrata, of Kalaa, of the Beni-Hammad etc.

For its own part and the same reason, the school of Cordova found itself in the 12 th century freed from Asian influences, and it developed a peculiar and charming style, whose flowering was completed in the 14 th and 15 th centuries. From the 12 th century it prevailed in Morocco and Tlemcen, the emigration of the Moors, driven from Spain by the Christian "reconquest", introduced it throughout all northern Africa, where the native architecture still declares itself as "Andalusian".

The artistic history of the Persian middle ages is imperfectly known; it is probable that the disturbances and invasions, that for centuries desolated Persia, opposed the architectural expression of its genius, whose vitality was attested by an important literary production.

With regard to art, Mohammedan Mesopotamia remained Sassanian; [2] it even drew from the Babylonian and Assyrian stocks as attested by the ziggurat forms of the minarets of its mosques. [3]

Note 2. For example, note the arrangement of the great halls covered by tunnel vaults and opening on a court, presented by an Abasside edifice (9 th century) at Dar El-Khalif. (Left bank of the Tigris, 3.1 miles north of Samarra).

Note 3. See those of Samarra and of Aboudolaf. Also see page 234 and Fig. 151.

Likewise in Persia, where traditionalism is emphasized in the affiliation connecting the "talar" of the dwellings to the apadana of the Achemenide epoch, the "liwan" of the mosques to Sassanian halls, and the ordinary method of covering to t that of the Palacas of Firouzabad and of Sarvistan. (Volume I, page 394; Volume II, pages 6, 12).

The opening of the Persian style was delayed until the end of the 16 th century; it then realized a brilliant formula, which combines grandeur of conception, taste in composition, science in execution, and an exquisite feeling for effect.

Its radiation was as energetic as extensive. (Pages 223, 225). Besides the art of Egypt and of Morocco, previously m mentioned, it strongly affected that of the Seldjouk and Ottoman civilizations, and impressed on that of Mohammedan India its definitive orientation. In truth, Persian architecture borrowed some things from the latter; in the Turkestan portion of its area, it admits some elements of Chinese origin, [1] and perhaps had some obligations to Armenian construction. ((Pages 241, 248, Note 2).

The development of the Turkish school passed through two phases; in Anatolia in the service of the Seldjouk civilization, it grew under the triple influence of Armenia, Persia a and Syria. After the establishment of the Ottomans in Europe, it followed the course of Byzantine architecture. [2] But by various innovations, some of which had great consequences, and by the introduction of modes of Syrian, Egyptian and Persian decoration, it created an art, remarkable, rational, scientific and monumental, which was strongest in the 16 th and 17 th centuries. [3] The fame of the great sultans of the 16 th a and 17 th centuries aided it to contribute to the ripening of that of India. [1] Its career was interrupted in the 18 th century by an invasion of European taste.

Note 2. Indeed, many great Ottoman architects belonged to the conquered peoples. Thus the author of the Mosque of Mahomet II at Constantinople and that of the Yechil Djami at Broussa were Greeks; respectively being Christodoulos and Ilias -- Ali Sinan, the most illustrious of the masters of the sch-

school, and Khair-ed-din, the creator of the Bayazidie, were Albanians.

Note 3. Ottoman architecture ower much to Sinan. By erecting masterpieces like the Sulemanie of Constantinople and t the Selimie of Adrianople; by furnishing plans for 307 edifices for all purposes, he multiplied models of science and taste; finally, his numerous pupils remained faithful to his p principles, which they exported, even into India.

Note 1. Architects were requested from Soliman by the emperor Baber; from Mahomet IV by Shah Jehan. Several pupils of Sinan were in the service of the Great Moguls.

Until the end of the 13 th century, the Mohammedan architecture of India was only distinguished from the native style by the details. [2] Then Persian influences exerted themselves at the expense of the ornamental exuberances of Hindoo genius. Their development was partly consecutive to the foundation of the Mogul empire, and doubtless to the intervention of Ottoman architects, but led at the middle of the 16 th century to the formation of a style, admirable in many respects, a combination of Persian grandeur and of Hindoo fantasy. At first stamped with power and originality, after the second third of the 17 th century, it inclined to elegance, to finally fall into trickery. (Book V; Part I).

Mohammedan India exported to Persia the type of bulbous dome and also the ogee arch, which it derived from Buddhist and Brahmin India. (Pages 316, 324).

III. Radiation.

The extension of Mohammedan architecture beyond the borders of Islam was mediocre. Still, note its effect on the school of Byzantium in the 9 th century (page 140), and on those of Armenia, Russia, Servia and Moldavia-Wallachia (pages 84, 261, 267, 268, 273, 276, 279, 282); the persistence of the Moroccan style in Sicily under the Norman supremacy and its extension into southern Italy; the survival of Andalusian art after the destruction of the Moorish states; finally, a strong influence on the Christian art of the West.

Chapter 3. Programmes and their Realizations.

I. Secular, Military and Funerary Programmes.

Except in the matter of hydraulics, Mohammedan architecture distinguished itself little in works of public utility, and for fortifications limited itself to copying the Byzantines.

However, note the grand and practical simplicity of its conception of the caravanserai; a great rectangular court -- sometimes a vast covered hall -- with fountain and basin at its centre, surrounded by stables and storerooms in the ground s story, with chambers in the second, reached by a gallery.

On the other hand, it derives honor from its elaboration of domestic programmes.

Required by the customs of the East, it jealously protects the interior from curiosity, and ensures a strict separation of social and family life. On the one hand, it distributes the rooms around one or more courts; raises facades with as few openings as possible; places over the windows the mask of a close lattice; reduces the means of access to a narrow doorway and a corridor, generally crooked. On the other, it divides the dwelling into two very distinct parts; one, the selamlik, being open to visits; the other, the harem, being secluded.

It understood how to accommodate the arrangement to the conditions of a hot climate and to render the habitation pleasant. In the city, space was gained on the street by the expedients of stories corbelled out and of trellised enclosures on balconies called mushrabiyes (148); porticos and galleries placed around the court, providing access at the same time as sheltering the chambers from excess of light and heat, permitting living in the air; the roofs were arranged in terraces for taking the fresh air; an equipment with baths was the rule, often more luxurious than the apartments; the salon (liwan) was a great room opening for its entire width on a court or another lower hall, refreshed and enlivened by a basin, a and by fountains for the rich (120; 133, 3; (1,4,5); 4).

For a palace or a pleasure chateau, the principle of arrangement is the same, only that the elements of the residence are scattered throughout the extent of a great garden.

The throne and audience halls (divan) occupy one of the si-

[illegible] of a court, [illegible] by portions and [illegible] by [illegible] and beds of [illegible] (1[illegible], 2 ([illegible]); 1[illegible]; 1[illegible]); in [illegible] -- where they are [illegible] "[illegible]" -- and in India -- [illegible] of the [illegible] [illegible] -- these are [illegible] of an open [illegible] and [illegible] in the [illegible], [illegible] in the [illegible] and [illegible]

[illegible] (1[illegible], 2 ([illegible]); 1[illegible]).

Note 1. [illegible]

The living rooms, kitchens, storerooms and offices extend along the sides of the courts (1[illegible], 2; ([illegible]); [illegible] and there are [illegible] or [illegible] kiosks provide places for repose (1[illegible]; [illegible]).

Note 2. See [illegible] at Lepanon (1[illegible]; 1[illegible]; [illegible] [illegible] of [illegible] at [illegible] (1[illegible]).

Note 3. See the [illegible] of [illegible] (1[illegible]; [illegible] the [illegible] in the [illegible] of Constantinople.

In its elementary form, the Mohammedan tomb is [illegible] a [illegible], more or less [illegible]. For a [illegible] a mausoleum, canopy or chapel is erected in the [illegible] of [illegible], if possible. [illegible] proportions may attain to those of a great monument, particularly in Egypt, Persia, [illegible] or Turkey, and especially in India, where to cite only two or three examples among many, the Tomb of Humayun near Delhi (1[illegible]), that of Akbar at Sikandara, of Mohammed at Bijapore, and particularly the Taj Mahal at Agra (1[illegible]; 1[illegible]; 1[illegible]), which rival the most [illegible] secular or religious edifices.

At Jaffa, the [illegible] programme for a prince comprises a [illegible] and sometimes a [illegible] (1[illegible]; 1[illegible]; 1[illegible]). The separation of the sexes is maintained as in life.

II. Religious Programmes.

[illegible] of the direction of [illegible], so that the person praying could [illegible]

sides of a court, generally bordered by porticos and decorated by basins and beds of flowers (133, 2 (4,6); 134; 166); in Persia -- where they are called "talars" -- and in India -- direct descendants of the Achemenide apadana [1] -- these are pavilions composed of an open columnar hall and an apartment in the rear; awnings, hung in the intercolumniations and obliquely before the facades, protect them from the heat of the sun (133, 2 (6); 125).

Note 1. Volume I, page 394.

The living rooms, kitchens, storerooms and offices extend along the sides of the courts (133, 2; (9, 10); here and there open [2] or enclosed [3] kiosks provide places for repose (125; 126; 133, 1,4).

Note 2. See Pavilion of Mirrors at Ispahan (125; 133, 1); pavilion in stories in the Palace of Akbar at Fathpur Sikri. (126).

Note 3. See the Ziza and the Suba at Palermo (133, 4); the Tchinte kiosk in the Old Seraglio at Constantinople.

In its elementary form, the Mohammedan tomb is reduced to a stele, more or less sculptured. For a deceased man of rank, a mausoleum, canopy or chapel is erected in the midst of a g garden, if possible. Its proportions may attain to those of a great monument, particularly in Egypt, Persia, Turkestan or Turkey, and especially in India, where to cite only two or t three examples among many, the Tomb of Humayun near Delhi (1 (135), that of Akbar at Sikandara, of Mohammed at Bijapore, and particularly tha Taj Mahal at Agra (127; 128; 166), which rival the most magnificent secular or religious edifices.

At Cairo, the funerary programme for a prince comprises a mosque, fountain, elementary school, frequently a seminary a and sometimes a monastery (137, 10; 148). The separation of the sexes is maintained as in life.

II. Religious Programmes.

Mohammedan worship required a sacred enclosure; a shelter for the faithful; a basin for ablutions, an indication (kibla) of the direction of Mecca, so that the person praying could turn toward the holy city; the means for the clergy to proceed to the reading of the Koran on the one hand, and on the o other to call the people to prayer.

These were satisfied by a programme (137, 1) comprising the realization of a rectangular enclosure (haram) orientated by its longer sides; the abutting of porticos (liwan) against t the four walls (137, 2), open towards a court (sahn; 137, 1), at the centre of which a canopy sheltered a fountain (midha; 137, 4); the arrangement of a service court with basin and latrines (137, 9); giving to the portico of the "liwan" on t the side next the holy city a greater depth, and assigning to it the role of a hall (137, 1(3); 139); the placing on its r rear wall of a sort of indication (mirhab) of the direction of Mecca (123; 136; 137, 1 (5)), at first in the form of a f false doorway, and later that of a niche; the erection in the vicinity and at its right hand, of an elevated pulpit (mimbar) for the imam (136; 137; 1 (6)) and of a platform (dekke) for the moballigh, charged with reproducing for the distant believers the acts of the imam and of "making them come to prayer"; (137, 1(7); 145); finally, the construction of a tower (minaret) accessible by the muezzin, charged with calling believers to prayer (118; 119; 137, 1 (8); 138; 148; 151).

This plan offers the advantage of being extended at will, either by the elongation of the oriental liwan, or by the multiplication of its bays, [1] evidently derived from that of the Semite temple (Volume I, pages 161, 166); it further recalls that of the Christian basilica with an atrium (page 27).

Note 1. Note the successive enlargements of the Mosque at Cordova (139).

A variant, whose vogue commenced about the 12 th century is distinguished by a mode of exalting the dignity of the mirhab. The means is simply the enlargement of the aisle leading to it (137, 2,4), or by the formation of a sanctuary by assigning a greater width to the last bay of the portico (137, 2), or rather by suppressing a portion of the isolated columns b before the sacred niche. (137, 3). The space provided by this operation is sometimes isolated by a barrier (maksoura), reserving it for the prince (136; 137, 5). [1] Besides the Moroccan-Spanish school freely gives to the mirhab the dimensions of a small circular chapel, accented externally by a dome; the entrance is marked in the same fashion and also by a doorway (137, 3,5). [2]

Note 1. See the Mosques of Cordova, Mansoura-Tlemcen, Kulbarga and of Fathpur Sikri.

Note 2. See also at Cairo the Mosques El Azhar and El Hakam.

Under the influence of Byzantine art, the Ottoman school replaced the portico of the mihrab by a nave, as open as possible, whose capacity was sometimes increased by the arrangement of galleries (122; 137,6; 145). Rarely -- the Green Mosques of Nicea and Broussa present examples -- it gave this a vestibule, equivalent to the Christian narthex. Often on the contrary, it complicated this by various annexes for use as library, seminary, hospital and caravanserai.

A second type of mosque -- of Persian origin[3]-- substituted for the four porticos just mentioned as many great naves arranged in cross form. These are open (137, 7,10); others are preceded by a columnar porch, open for its entire width and height (137, 8; 138). Sometimes the vast court being retained, these occupy the middle of each side and are connected by galleries (137, 7,8); [4] sometimes a reduction of the area open to the sky makes them almost adjacent (137, 10); [5] finally, sometimes a covering of the central area realizes the unity of an edifice on a central and radiating plan (137, 9); [6] This is as if the principle of the Semite haram had been supplemented by that of the Christian church. Yet the Persian formula of the mosque appeared to be native and traditional in what recalls the arrangement of the Sassanian palaces, the great open hall of Firouz-Abad and of Ctesiphon, the audience hall with monumental vestibule at Sarvistan, and the cruciform plan of the propyleum of Rabbat-Ammon (6; 63).

Note 3. That was imported from Egypt in the 12 th century.

Note 4. See the Djouma Mosque of Ispahan.

Note 5. See the Mosquee of Hassan, Esbek, and of Koit Bey at Cairo.

Note 6. See the "Blue"Mosque of Touris and the "Green"Mosque at Broussa.

For commemmorative mosques or those for women, a circular or polygonal outline was common (137, 11) [8]

Note 8. See the Kubbet-es-Sakhra at Jerusalem.

As for seminaries or medresses, the Persian arrangement was applied to them, when the religious instruction treated of the

four orthodox rites, [1] and it was suitable to arrange as many separate rooms (137, 10; (13, 13, 13, 13)).

Note 1. Malexite, Chafeite, Hanbalite and Hanefite.

[illegible]

[illegible] the Lower Sind, for Pharaoh [illegible] through [illegible] the Indus, also), it appears probable that [illegible] in the island, it [illegible] as much science as [illegible], and some of the natives have done it great honor.

I. [illegible].

[illegible] possess at the century, of time and of mutual labor [illegible] [illegible].

[illegible] [illegible], [illegible] in [illegible] [illegible] American school loved to express.

As for [illegible], it always [illegible] to be [illegible] [illegible] in Syria and [illegible]; [illegible], it [illegible] of [illegible], [illegible] [illegible] [illegible] it [illegible]; in Africa, it [illegible] [illegible] [illegible] it [illegible] [illegible] in India.

II. [illegible].

[illegible] and [illegible] [illegible] [illegible]

Chapter 4. Construction.

Mohammedan construction calls for different appreciations, according to whether it is considered in the realization of a domestic programme or in the service of monumental architecture. In the former case, for reasons previously indicated, (pages 181, 203), it appears premature and careless of stability; in the latter, it manifests as much science as care, and some of its methods have done it great honor.

219 I. Materials.

In a general way, it employed very little wood, because the greater portion of its area was poor in trees, and much clay, because of the economy of time and of skilled labor permitted by that material.

It utilized this, either tamped into forms or moulded into crude or burned squares. The use of bricks was constant in Persia and Mesopotamia, dominant in Turkey, common in Morocco and India, and general in Egypt, from the 7 th to the 13 th century. Concrete was equally usual, the same with gypsum, which the Andalusian school loved to excess.

As for stone, it always possessed in the form of rubble or of cut stone -- favor in Syria and Anatolia; after the 12 th century, it began to gain that of Egypt, which it entirely
220 obtained from the 14 th; in Turkey, it competed with brick, which it finally supplanted in India.

II. Methods.

Mohammedan carpentry and particularly joinery afford proof of extreme skill. The Andalusian school is characterized by the art with which it substitutes for great timbers boxes covered with plaster or not, and it erected economically the f framework of a plaster structure (140, 1).

Admirable likewise were Mohammedan lattices, whose construction by halving thin pieces is appropriate for hot countries, in which wood is subject to shrinkage.

221 Wall.

Construction in tamped earth or concrete was often strengthened by courses of tiles or beds of concrete, as well as by vertical bands of bricks. That of bricks was joined by thick layers of mortar.

As for stone masonry, Syria, Egypt and India present admir-

[illegible]

[illegible] ago, when the issue is arresting and surely in its [illegible]

[illegible] of the [illegible] the [illegible] [illegible] free [illegible] [illegible] with a [illegible] [illegible] [illegible] [illegible] closed by a [illegible] [illegible] [illegible] [illegible] or stone (i.7; 101) or by [illegible] [illegible] [illegible], and at [illegible] the 10 to 20 [illegible] were filled with [illegible] of [illegible] in the [illegible] of a [illegible] [illegible], or [illegible] [illegible] [illegible] [illegible] (i0).

[illegible]

As an [illegible] [illegible], Homeneum [illegible] freely [illegible]

[illegible] [illegible], [illegible] [illegible] [illegible] time it [illegible] [illegible] at a [illegible] [illegible] [illegible] [illegible], Power or [illegible] [illegible]

[illegible], [illegible] by the [illegible] [illegible] of [illegible] [illegible] ; [illegible] [illegible] [illegible] [illegible]

admirable specimens.

Nothing is perhaps more characteristic of Mohammedan construction, than its taste for corbelling and skill in its use.[1]

Note 1. For what concerns stalactites, see page 238.

The ordinary shape of the openings was arched (141). The windows were frequently coupled with a little column or pillar between them, being closed by a perforated screen in plaster or stone (157; 161), or by lattices of wood (143), and after the 15 th century were glazed with bits of glass set in the perforations of a plaster panel (161), or assembled in s stained glass windows (162).

Portico.

As an isolated support, Mohammedan architecture freely made sacrifices to elegance and preferred the column to the pier; so much the more, because for a long time it found them at p pleasure already shaped in Grecian, Roman or Byzantine edifices. It obtained the support necessary for the imposts of arches, either by the Byzantine expedient of an impost block ; (139; 158, 1); or as the fashion in Spain -- by placing t two or even more columns close together (120; 193, 4).

The Mohammedan portico is an arcade.

The pointed arch was usual in Persia from the 8 th century;[3] in Spain and Egypt after the 9 th;[4] in Turkish countries at all epochs (119; 122; 145); in India after the conquest. In the first of these countries, it was low and could be inscribed within a semicircle, by reason of the almost constant flattening of its upper half (138; 141; 5,6; 159); in the second, it was very obtuse, then increasingly more pointed (141, 1-3; 161).

Note 3. See the facade of the Palace of Bakka. Recall that the pointed arch was known to the Sassanian school, and m much earlier to the schools of ancient Mesopotamia.

Note 4. Speaging of semicircular arches, a Mohammedan of Syria wrote at the beginning of the 13 th century:-- "Those are Latin arches, i.e., round arches". (Cited by M. de Vogue. Temple de Jerusalem, page 94).

The horseshoe form, that forms a peculiarity of the Moroccan-Andalusian style, was at first exaggerated, and then lessened after the 12 th century (126; 139; 141, 10-12; 142, 1).

[illegible]

[illegible]

[illegible]

We have had occasion to indicate its role of masking a structural expedient in order to omit the carpentry support of the centre. [1] With a view to reduce the proportions of the l latter, Mohammedan architects conceived the erection by horizontal corbelled courses for the lower half of the arch, and to arrange by receiving the springing points of the voussoirs, to obtain points of support for the centre. Covering the angles with mortar produced a festooned appearance and turned the artifice into a charm, so much appreciated, that it was early sought without any reason of a structural advantage. (120; 123; 134; 139; 142, 3,4; 154; 155).

Mohammedan India continued to use the ogee outline, which pleased Buddhist and Brahmin India (pages 316, 324); (127; 1 128; 134; 135; 141; 8,9). Yet from the moment (decline of t the 13 th century) when it adopted the system of radiating c courses, its use formed a structural heresy. It was likewise for ornamental reasons, that this form was chosen in other parts of the Mohammedan world, in Turkestan, for example (121), and in the Turkish country (131, 132; 160).

The school of Syria and its related one of Egypt were characterized by the excellent masonry of their arches, which frequently comprised strengthening by indentations (142, 6).

Charmed with lightness and effect, Andalusia conceived the replacing of solid tympanums by lattice work in pottery. (142, 7). It further distinguished itself by an ingenious method of constructing an elevated portico with columns of small height. [1]

Note 1. See the Mosque of Cordova and the Alcazar of Seville.

Superposing two series, these were either fixed -- when the upper story consisted of small piers -- by means of arches t turned between them at the levels of bases and mid-heights ((140, 143, 10) or -- when all were columns -- by the aid of half arches connecting in pairs the capitals of the supports in the lower series with the imposts of the upper arches (142, 11, 12).

Covering.

The various systems for covering an interior were familiar to Mohammedan construction.

The ceiling was usual in Morocco and Spain, as well as in

[illegible] a [illegible] line is to [illegible] (1.3, 3).

[illegible] Among Aerik, [illegible] [illegible] of a [illegible] [illegible] in pieces [illegible] [illegible] [illegible] of [illegible] [illegible] [illegible]

Egypt until the 12 th century (140, 2).

Jerusalem retains over the Mosques El Aksa and the Kubbet-es-Sakhra [2] wooden shells, constructed like the hull of a vessel, i.e., composed of planks nailed on numerous meridian ribs in the form of pointed arches, rendered stable by their joining a single strut and their intersection at different heights by cross beams and diagonal braces (140, 3,4).

Note 2. The existing shell dates from 1022 and reproduces another, contemporary with the edifice and destroyed in 1016.

The types of vaults employed by Mohammedan architecture are in order of frequency, the dome, cross vault and tunnel vault.

To realize the latter in bricks, it continued faithful to t the oriental tradition of construction by slices. [3] In Persia and Mesopotamia, there seems to have been appreciated the Sassanian artifice of paneling the upper part of an interior by means of great arches supporting transverse vaults. (140, 14). [4]

Note 3. See volume I, pages 71, 138; volume II, page 14.

Note 4. See the Khan Orthma at Bagdad (12 th century), a bridge near Tauris, published by Dieulafoy. For the Sassanian prototype, see page 16.

The cross vault, jointed diagonally, was in constant use, particularly in Syria; for love of effect, the intersections were multiplied.

From the 10 th century -- i.e., a century and a half before the epoch in which it is found in France -- the system of the ribbed vault was known to the Andalusian school; within the mihrab of the Mosque of Cordova (965) and the Mosque of Luz at Toledo (144, 12,13).

Yet in Persia and India at all times and in Egypt after the 14 th century, covering by domes was the rule.

Various profiles were common, all being stilted; elongated ellipsiidal, or with conical crown in Persia; pointed in Egypt; conical in Mesopotamia and Seldjouk Anatolia (144, 17); bulbous in modern Persia and in India (121; 124; 127; 135; 1 138; 150).

Note 1. For the Indian origin of the bulbous outline, see Book V, part I.

Ingenious and scientific, the Persian school conceived several kinds of construction, some of which are very remarkable;

[illegible] tomb, with minor in artist's studio [illegible] exemplifies a method now at work by the Tomb of Nefertari and of Ramses I at Deir el-Bahari [illegible] of Sahure at Zawa (Ibid., 11); also by contemporary [illegible] (Daumas, pls 5, pls 6), an idea of which is given by the scene of the principal chamber of the Mastaba D [illegible] (Ibid; 15; Ibid; 16); the [illegible], [illegible] in the funerary house of Sahure (Ibid. 1[illegible]); the [illegible], a typical specimen of which is found by the door [illegible] (Ibid, 7). The shrine is [illegible] by the division of the chamber into two [illegible], [illegible] by [illegible], which could [illegible]. The last compartment has the [illegible] of the [illegible] into two parts; a [illegible] in which the [illegible] overhead the surface of the [illegible], and an upper one where the [illegible] is enhanced by a [illegible] and [illegible], and is sometimes aided by the [illegible], [illegible] intrados and [illegible] the [illegible] (Ibid, 7).

[illegible] of stability, the [illegible] [illegible] a [illegible] shell by means hollow [illegible] of [illegible], connected by a [illegible] and a covering of the same material.

The experiments by which Monumenter architectonic requirements [illegible] the lifting of a [illegible] to the top of a square supporting [illegible], according to [illegible] they were carried in Persia, the Indies, in Tonkin and Cochin China, or in Egypt. In the first case, there was built of an angle straight executed according to the [illegible] formula (page 10; 16a, 8), or rather by means of a [illegible] of [illegible] observed by the [illegible] [illegible]

[illegible] [illegible] [illegible] [

we cite that witt niches in series above each other, examples of which are offered by the Tombs of Zobeidah and of Ezekiel at Bagdad and that of Daniel at Susa (144, 11); that by corbelling or stalactites (Chapter 5, page 238), an idea of which is given by the porch of the principal liwan of the Mosque D Djouma at Ispahan (119; 123; 128; 138; 152); the cellular, observed in the funerary Mosque of Sultanieh (144, 1,3); the bulbous, a typeical specimen of which is formed by the Gour Emir at Samarcand (144, 7). The third is characterized by t the division of the masonry into two thin shells, connected by transverse partitions, which bind together the shells. T The last comprises the division of the height of the calotte into two parts; a lower one in which the horizontal courses overhang the surface of the drum, and an upper one where the beds radiate; the system is strengthened by a framework and ties, and is sometimes aided by the sides, detached from the intrados and tending toward the centre (144, 7).

Careless of stability, the Andalusian school practically r realized a light shell by using hollow prisms of gypsum, connected by a mortar and a covering of the same material.

The expedients by which Mohammedan architecture required t the fitting of a dome to the top of a square support varied, according to whether they were applied in Persia and India, in Europe and Ottoman Asia, or in Egypt. In the first case, this was that of an angle trumpet executed according to the Sassanian formula (page 15; 144, 8), or rather by means of a system of consoles obtained by the progressiwe corbelling of horizontal courses, and strengthened by arches (144, 6110). The Ottoman school employed sometimes the Byzantine pendentive of a spherical triangle (page 162), sometimes that in stalactites, [4] preferred and perfected by Egyptian architects ((144, 15,16).

Note 4. See the half domes of the Mosque of Ahmed I at Constantinople.

According to oriental tradition,[1] and in conformity to the geological conditions of countries exposed to earthquakes, M Mohammedan constructors never failed to strengthen their structures by wooden anchors, enclosed in the thickness of the masonry, and by visible ties across arches and domes.

Note 1. Volume I. pages 156, 187; Volume II, page 11.

The manner in which the Persiand provided resistance to pressures and thrusts of vaults -- otherwise reduced by their method of constructing the lower portion with horizontal courses -- indicates as much science as ingenuity.

At first, they set the calotte nearly on the internal side of the top of the support, so that the portion of that outside it performed the office of a buttress. Better yet -- so proceeded the author of the Mosque of Sultanieh -- by duplication of the drum supported the dome by a second external one, connected to the former by an annular vault, they created a continuous flying buttress; by substituting great arches for the solid walls, they secured the ability to concentrate on some supports, selected and reinforced by a top load, the stresses of the hostile forces (144, 1,2). Let us add that the system of corbelled pendentives tended to the development of a centripetal force suited to neutralize the centrifugal force of the dome (144, 9).

The Ottoman school derived equal honor from the very elegant solution of the problem of abutments, that forms the covering of the Mosque of Ahmed I at Constantinople. A great central shell on arches is abutted by four half shells, since a all are largely open at their bases, the whole is so harmonious, that it appears light (144, 4,5; 145). [2]

Note 2. From the point of view of the impression of its v vastness, we may compare the covering of the Mosque of Ahmed I at Constantinople with that of the Tomb of Mahmoud at Bijapore, whose dimensions are as follows:--

Sides of the square support, 135 ft.
Pendentives spring 57.4 ft. above the ground.
Tops of pendentives are 110.0 ft. above the ground.
Diameter of circle limiting them, 97.0 ft.
Diameter of the calotte, 124.8 ft.
Vertex of calotte 178.5 ft. above pavement.
Thickness of calotte at base, 11.5 ft.
Thickness of calotte at top, 9.0 ft.

Conditioned by a hot climate and a lack of wood, the roof is almost always a terrace of tampel earth. When the edifice is vaulted, the extrados of the shell takes the place of the

229 roof. Still, let us note the copper covering of the wooden
236 dome of the Kubbet-es-Sakhra at Jerusalem, and the gable roof with trusses and tie beams, which cover the aisles of the Mosque at Cordova.

Chapter 5. Effect.

Nothing is more characteristic of Mohammedan architecture than its passion for effect, the origin of its most brilliant qualities as well as of its gravest defects.

I. Effects of Harmonic Order.

Mohammedan art was no more ambitious to enrapture the mind by the manifestation, than to astonish it by colossal proportions, or to impress the imagination and the heart by an artifice of arrangement and of lighting. The Persian and Indian schools alone -- the Ottoman and Egyptian, so far as dependent on the preceding, -- in restricted measure, proportional to the influence of Persia, were pleased by combining an entirety, [1] by candecing a composition, [2] and by refining a form, [3] A universal method of utilizing the scheme of a geometrical construction [4] for outlining a plan, for the arrangement of the ornamentation, for placing in proportion, was the cause, that under the variety, complexity and caprice of Mohammedan monuments are concealed the unity and rhythm of a mathematical arrangement (147).

Note 1. For example, see the cruciform plans of Persian m mosques (137, 7,8), their rectangular portals between two minarets (138); the centralized and balanced arrangement of the Bridge Rokn-ed-din at Ispahan; particularly the great groups, that are the glory of that city; its Park and the Meidan, with its enclusure of porticos in two stories, its monumental gateways, one of which gives access to the Imperial Mosque. (124).

Note 2. See the very symmetrical outline of the Ottoman mosque (137, 6) and of the Great Mosque at Delhi; the radiating and equilibrated composition of the great Indian mausoleums (127; 135); the candeced grouping of the elements of Ottoman and Indian roofs (149; 150).

Note 3. The Persian school is recommended by a feeling for lines manifested by the exquisite elegance of many of its domes, composed of two calottes of different heights; one being calculated for the internal, the other for the external effect (124; 138). Under its influence, the Egyptian school of t the 15 th century also sought refined curves; witness the purity of the profile of the dome of the Mosque of Kait Bey at

Cairo, and the very harmoniously accented profile of its minaret (146; 148). The Indian school yields the same observation (127; 135; 150).

Note 4. Thus at the Mausoleum of Sultanieh, all dimensions are derived from the diameter of a circle inscribed in the p polygon of the outline of the walls; the positions of the two centres of the Syrian pointed arch are determined by a distance from the centre of the chord equal to one eighth of that line; those of the four centres of a Persian arch are obtained by two constructions, explained by our sketch (147, 1,2); the assemblage of Andalusian stalactite vaults (page 226) is regulated by the combinations of seven sorts of prisms, one with rectangular section, five with right-angled triangular sections, and one with horizontal section drawn as a lozenge or a half lozenge (147, 3); finally the polygonal and the "arabesque", dear to Mohammedan decorators, exhibit solutions of the problems of constructive geometry (page 250).

II. Effects of Picturesque Order.

In brief, to the effects of a picturesque order tended all the sympathies of Mohammedan architecture.

Fig. 147. Mohammedan application of the system of outlining and proportioning by geometrical constructions. Page 232.

1. Octagon of Kubbet-es-Sakhra at Jerusalem. (Section on the apothem). The apothem being divided into 16 equal parts, the 9 th is chosen for the axis of the drum. The equilateral triangle O C D is constructed on that axis and gives the height O D of the drum; the triangle A B C gives that of the external wall and the height I B of the top of the intermediate wall. The triangle O I E is constructed on the axis of the triangle A B. C and gives the height O E of the interior of the dome. The parallels to the sides of the triangles previously mentioned drawn from each division of the apothem or t their middles, give points of the details. (After M. De Vogue. Temples de Jerusalem).

2. Mausoleum of Sultanieh. (147). The greatest diameter a b, taken vertically, gives the top c d of the supporting w walls. The least diameter A B, taken twice in the same direction, gives the vertex V of the calotte. The measure of one side of the octogon, taken once vertically, gives the level

I K of the sills of the opening in the second story, and taken twice, the level L M of the crest of the arch. The apex of the equilateral triangle constructed on G H gives in Y the top of the opening in the ground story. Its width is determined by the construction of a square N P Q O within the triangle previously mentioned. The vertex of the arch Z is given by the superposition of an equilateral triangle on the square P T U S.(After M. Dieulafoy, Art Antique de la Perse).

3. Division of a stalactite pendentive into prisms (147), whose sections are a rectangle (B), a right-angled triangle (A), a lozenge (C C) or a half lozenge (C). (After Owen Jones, Alhambra).

4. Outline of the depressed arch of the Persians. (147). 1. On A B (half span of arch) construct the square A D C B; divide A B into 6 parts. Draw C O^2 (C 1 = O^2 4). From O^2 as centre describe D 2. -- 2. Divide A B into 4 parts. From the first division O 1, describe Z B. (After M. Dieulafoy, same work).

In good measure, these required monumental modelling. Like the feeling for harmony, the taste for the appearance of a g general relief was confined to Persia, India, the Ottoman empire, and to Egypt in the 14 th and 15 th centuries. It is expressed by the powerful contrast, that the arrangement of a Persian mosque institutes on the one hand, but the verticality of the four liways (page 215) and the horizontality of t the intermediate galleries, and on the other, between the shaded accenting of the facade of the former, and the continuity of the front of the arcade of the latter; [2] by the majesty of the insertion ofan elevated platform, accessible by monumental stairs, and by the Rythmic variation of unequal masses and of diverse shapes, which characterize certain mosques in India [3] by the hierarchical grouping of a high central dome, the subordinate ones, angle towers and turrets, that Indian mausoleums erect above a terrace rising from gardens; [4] by a story of subsidiary calottes, and by the inheritance of the slender "candles" (minarets) exhibited by Ottoman mosques; [5] and by the irregularly accented reliefs of the mosques of the best epoch in Cairo (148). [6]

Note 2. For example, see the Imperial Mosque at Ispahan ((124; 138).

Note 3. See the Great Mosque of Delhi (150) and that of F Fathpur Sikri.

Note 4. See Mausoleum of the emperor Humayun (135), Tomb of Akbar at Sikandara, and Taj Mahal at Agra (127).

Note 5. See Mosque of Ahmed I (148), the Sulemanie at Constantinople.

Note 6. See funerary mosque of Kait Bey at Cairo (148).

Pursued in the same spirit, the search for effect by modeling the separate masses sometimes produced the most happy results. It particularly affected the dome, whose outline was always slender, often ogee and even bulbous, terminated by an ending in a slender point, or sometimes by a lantern (121; 1 124; 127; 135; 138; 1465 148; 150); [7] and still more the minaret, whose shape further appears to have been conditioned by local traditions (151). In Mesopotamia, on the model of the Babylonian-Ninevite ziggurat were erected towers with a helicoidal ramp and crowned by a kiosk; [8] Syria adhered to the p prism on a square plan, quite stumpy, that in the pagan and Christian epochs it erected as a funerary monument, and which fashion was introduced into Morocco and Spain [9] at the same time as the religious and political influence of Damascus (1 (118; 151, 2). Doubtless in the image of the Pharos of Alexandria, formed by placing an octagonal on a square prism, the Egyptian school, after attaining maturity, placed several forms above each other -- generally three --, each successively smaller and differently shaped (square and octagonal prisms, cylinder) with platforms corbelled out, the top being crowned by a lantern (148; 151, 3).[1] Always charmed by slenderness, [2] Persia adopted the form of a slightly conical shaft surmounted by a projection bearing a pavilion (119; 124; 138, 4). [3] Inclined to redundance, India conceived the superposing of s several slender and diminishing cones (150). [4] Finally, the Ottoman school -- perhaps impressed by the triumphal columns of Constantinople -- erected tall minarets terminated by a p pointed cone and with balconies at different heights (149; 151, 5).

Note 7. See Cairo.

Note 8. See the Mosque of Samarra and that -- imated from it -- of Ibn Touloun in Cairo.

[illegible] of the [illegible] the [illegible] of [illegible].

[illegible] 1. [illegible] the [illegible] proportions of [illegible] c [illegible]

[illegible] Lauder [illegible] [illegible] [illegible], [illegible] [illegible] from the [illegible] [illegible] of [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] -- and [illegible] [illegible] [illegible], which pierces it (1[illegible]; 1[illegible]); not [illegible] [illegible] elegant in [illegible] as picturesque forms of the [illegible] [illegible] [illegible] (1[illegible]; 1[illegible]; 1[illegible]).

Bibliography [illegible].

[illegible] of [illegible] the [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible].

In the first place, it is necessary to mention the [illegible] [illegible] [illegible] in the i[illegible] of [illegible], [illegible], [illegible], [illegible] [illegible] [illegible], and finally [illegible] in the [illegible] [illegible] [illegible] [illegible]

Note 9. See the minaret of the Great Mosque at Damascus; t that of Tangier, the Giralda of Seville.

Note 1. See particularly the minaret of the funerary Mosque of Kait Bey.

Note 2. Note the very slender proportions of Achemenide c columns. (Volume I, page 410).

Note 3. For example, see the Mosque of Ispahan.

Note 4. See the minaret of the Mosque of Koutab at Delhi.

Note further the grand movement of the Persian portals, resulting from the twofold contrast of their rectangular panel with the slender cylinders rising at the angles -- and with the pointed arch, which pierces it (124; 138); not forgetting the elegant as well as picturesque forms of the kiosks and p pavilions (125; 126; 131).

Effects of Secondary Relief.

Mohammedan monuments present numerous and remarkable examples of obtaining the effect by secondary reliefs.

In the first place, it is necessary to mention the shaded recess hollowed in the front of facades, Syrian, Persian, Seldjouk and Ottoman, and finally Egyptian in the 14 th and 15 th centuries, [5] and the enormous porches, high and deep, frequently flanked by lateral niches (119; 124; 127; 128; 135; 138; 148; 150; 152; 166). [6]

Note 5. For example, see the Mosques of Hassan and of Kait Bey.

Note 6. Concerning the lateral niches, see particularly t the Ottoman and Seldjouk porches (119).

Let us mention then -- useful as well as ornamental, since in strengthening the facades, it permits thinning the masonry -- a treatment of the surfaces by a system of great pilasters, as shown by many monuments of Cairo (148; 152); or of arches, as on the Palace of Rakka, the Tomb of Zobeideh and the Mausoleum of Sultanieh; or at the sides, as shown by certain Persian, Indian, Seldjouk and Ottoman and Egyptian monuments; [7] (119; 121; 151); or finally the network panels, common in Corocco and Spain after the 12 th century (118).

Note 7. See the side dome of the Gour Emir at Samarcand; the minaret of the Mosque of Koutab at Delhi; the conical do-

[illegible] of [illegible] [illegible], for example.

Notable [illegible] is the play of light and shade, incorporating a [illegible] variety, produced by the projection of two successive a [illegible] [illegible] in [illegible] and [illegible] [illegible] in [illegible] [illegible] [illegible]

domes of Anatolia; the Seldjouk and Ottoman minarets; the ending in wide caps of certain minarets in Cairo (that of the Mosque of Baber Gachenguir, for example.

Notable again is the play of light and shade, impressive a and varied, produced by the projections of the stalactites a and their shape in curved and angular recesses; in prismatic crystalline forms in successive rows, even in slender pendants (119; 120; 123; 128; 138; 144; 145; 152). Finally, we cite as common to the Seldjouk and Ottoman schools, a method of enhancing by a great ornamental panel on the flat surface of a tympanum (119).

On the other hand, so to speak, no mouldings; a lack resulting in great measure from the predominance of the construction in bricks.

It is again a characteristic of Mohammedan architecture, t that its love of festoons revealed by the current use of trefoil arches (135; 154; 151) [1] and of toothed projections, frequently complicated (118; 148; 150; 166).

Note 1. The construction of these festoons was very simple; at regular distances by the projection of one or more bricks from the surface of the intrados formed a milled edge, whose angles were rounded by a coat of mortar or of plaster (142,5).

Effect by Relief of Details.

That was necessary for Mohammedan art to derive from the r relief of details effects approximating those just enumerated.

Concerning the isolated support, aside from the caprices of the Indian school, the shape of the pier was monotonous; generally rectangular and often polygonal, as in Morocco, it is that of a rectangular prism with little columns inserted in the angles in the Cairo Mosque of Ibn Touloun; in the Mosque Djouma of Ispahan, that of a group of four cylinders (137, 7);[1] in the Mosque of Ahmed I at Constantinople being that of a f fluted shaft (145) etc.

Note 1. Notable is the analogy of this type with that realized in Chaldea thirty centuries B. C. (Volume I, page 135). Assuming that the Mosque of Ibn Touloun was imitated from that of Samarra, the mode of little columns in the angles of t the piers must be an importation from Mesopotamia.

Neither does the column lend itself to a prolonged study.

The shaft is either reminiscent of animals, and often sits directly on the ground (that is, it is generally plain, occasionally carved like a balustrade or even carpet) (180; 185, 5-8, 11, 12). The capital is varied. Sometimes it resembles a lotus plant. In Spain and Morocco, it is derived from the Corinthian (180; 188, 3) or from the Byzantine lotus bloom, and is made in the shape of a prism twice as wide as high, surrounding a cylindrical shaft surrounded by a collar of very much conventionalized acanthus leaves, connected with the elements of a bell (180; 1,2,4,10); a bell or calyx-like shape is not rare (180, 9,10) in Persia and Syria and an inverted cone (180, 7,10) in Persia and Syria and an inverted cone (180, 7,10) in Persia and Syria and an inverted cone (180, 7

Its shaft is without diminution or entasis, and often sets d directly on the ground (139); it is generally plain, sometimes turned like a baluster or even twisted (120; 153, 6-9,11, 12; 155). The capital is rather mean, frequently reduced to a simple slab. In Spain and Morocco, it is derived from the Roman Composite (120; 153, 9) or from the Byzantine impost b block, and it ends in the appearance of a prism twice as wide as high, surmounting a cylindrical shaft surrounded by a collar of very much conventionalized acanthus leaves, connected like the elements of a fret (153, 1,2,4,10); a bell or bulbous shape is not rare (153, 3,12); in Persia and Spain was an imitation of corbelled stalactites (153, 7; 155); in Turkey, of a group of crystal forms (153, 8). Andalusia loved graceful proportions (120), and in Turkestan, doubtless under the influence of China, [2] the Persian school imposed on stone columns the height of posts (153, 6).

Note 2. Further, see Book V; also note the very remarkable slenderness of the Achemenide columns.(Volume I, page 410).

Effects of Ornamentation.

Mohammedan architecture had a passion for ornamentation; in the interior, it lavished this over all surfaces possible; externally it was placed on the portals and niches, around the windows, on the domes, even on the entire edifice. [1] It was easily abused. But its elements were realized with a taste and art equally admirable, and it was applied with a very assured feeling for the effect, which very frequently appeared exquisite, though unequal.

Note 1. See the external mosaics of the Mosques of Jerusalem and of the Great Mosque of Damascus; the sculptured extrados of certain domes in Cairo (146); the portals of the Seldjouk monuments (119); particularly Persian and Indian monuments. Also note the Persian mode of decoration of the joints by modeling ornaments on the mortar (see the Mosque of Veramine), even by covering the joints with glass (see Dieulafoy. Acropole de Susa, p. 312).

Conditioned by the oriental temperament, by Mesopotamian-P Persian and Syrian tradition, but the current practice of construction in brick, and finally by an energetic influence of the style of decoration appropriate for fabrics, it neglected

[illegible]

for those of the [illegible], and [illegible] those of [illegible].

The monumental sculpture was essentially [illegible], realized by engraving, overlaying, sinking and embossing. On [illegible], it [illegible] in [illegible]; on stone, in the same country after the 14th century, in Spain, at least for the capital, before the 16th in Syria, Asia Minor, European Turkey and particularly in India, in all epochs. In Egypt before the 14th century, in Morocco and particularly in Spain, its execution was [illegible] mechanical, by modeling in mortar, stucco, and especially in plaster, or by the impression of moulds on a mass of these materials while still fresh. In all [illegible], its technics were a [illegible] of patience and skill (120; [illegible]; [illegible]).

A decoration by combinations of lines or surfaces resulted, not only from operations of incising, of marquetry incrustation, sinking or painting, but also from refinements in masonry, such as varied arrangements of bricks, or sometimes complex indentations of stone blocks, particularly of voussoirs [illegible] and the countries under the influence (142, 8). -

[illegible] fond of beautiful materials, that it appreciated especially for the gleam of light reflected by their polished surfaces. It was [illegible] with stucco coatings; wooden panelings were [illegible]. Level in Egypt; facings and pavements of marble were common in the same country ([illegible]; [illegible]; [illegible]); in [illegible] of hard stones were the great luxury of the Indian school in the time of the Grand Mogul ([illegible]; [illegible]); [2] gilding; [illegible] was universal in the Mohammedan world, and the quantity used was enormous in Persia, Asian and European Turkey ([illegible]; [illegible]; [illegible]; [illegible]; [illegible]).

Note 1. Decoration white, blue, yellow and red.

Note 2. The fashion was introduced by Europeans. The artist of the procedure was a Frenchman of Bordeaux, named Augustin or Austin.

Note 1. See the Position of the Mirrors at Ispahan. ([illegible]).

[illegible]

effects of relief, loved those of design, had an affection f for those of the materials, and adored those of color.

Its monumental sculpture was essentially flat, realized by engraving, overlaying, sinking and embossing. On wood, it flourished in Egypt; on stone, in the same country after the 14 th century, in Spain, at least for the capital, before the 13 th; in Syria, Asia Minor, European Turkey and particularly in India, in all epochs. In Egypt before the 14 th century, in Morocco and particularly in Spain, its execution was commonly mechanical, by modeling in mortar, stucco, and especially in plaster, or by the impression of moulds on a mass of t these materials while still fresh. In all fashions, its technics were a marvel of patience and skill (120; 155; 156).

A decoration by combinations of lines or surfaces resulted, not only from operations of incising, of marquetry incrustation, sinking or painting, but also from refinements in masonry, such as varied arrangements of bricks, or sometimes complex indentations of stone blocks, particularly of voussoirs -- methods appropriate, the first to Persia and the second to Syria and the countries under its influence (142, 6).

As we have stated, Mohammedan architecture was passionately fond of beautiful materials, that it appreciated especially for the gleam of light reflected by their polished surfaces. It was lavish with stucco coatings; wooden panelings were especially loved in Egypt; facings and pavements of marble were common in the same country (157; 158; 164; 165); incrustations of hard stones were the great luxury of the Indian school in the time of the Grand Moguls (128; 134; 157); [2] gilding; applications of mirrors or of glass cut in facets, which modern Persia adores; [1] finally, facings of faience, whose use was universal in the Mohammedan world, and the quantity used was enormous in Persia, Asian and European Turkey (121; 123; 136; 138; 145; 160).

Note 1. Decoration white, blue, yellow and red.

Note 2. The fashion was introduced by Europeans. The artist of the procedure was a Frenchman of Bordeaux, named Augustin or Austin.

Note 1. See the Pavilion of the Mirrors at Ispahan.(125).

Effects of Polychromy.

Effects of Polychromy.

Yet nothing was loved as much as color, and no means of producing a rich and universal harmony existed, to which recourse was not had.

Persia composed judicious harmonies by utilizing the diversity of tones offered by bricks, according to their burning.

From dichromy was obtained; in European and Asian Turkey by the alternation of layers of bricks and courses of stone in the Byzantine fashion; in the same region, as well as in Egypt from the 14 th century, and particularly in all epochs in Syria, by the contrast of stones, white and red or white and black (139; 148). [2]

Note 2. Gray, red, dark brown.

Finally, a polychromy was magnificently realized; either by painting on stucco, a system in favor in Egypt before the 14 th century, in Persia and India after the 16 th, in Spain and Morocco at all times; either by admirable marquetries of marble, in which Egypt excelled in the 14 th and 15 th centuries; [1] of more economically by stucco or mastic colored by recessions in the surface; or by incrustations with hard stones, of which India made a marvellous use (134; 157); or in very restricted measure and only in Syria, Egypt and Spain -- before the 12 th century -- by enamel mosaics in the Byzantine taste; [2] finally, and especially by ceramic facings, loved by all schools, but in which triumphed those of Persia and of Ottoman Anatolia. [3]

Note 1. Recall that the taste for marble facings already characterized the Alexandrine school.

Note 2. The execution moreover was Byzantine. See the mosaics of the Kubbet-es-Sakhra at Jerusalem; of the mirhab of the Mosque of Cordova.

Note 3. Indeed in central Asia, the tradition of the ceramic facing is lost in the darknesr of ages. (Volume I, pages 106, 144, 417).

At first Persia was contented with a coating of glaze on t the edges of the bricks. Thus it practised a mosaic of bits of faience cut in squares, assembled either on the wall, or in the workshop on a supporting panel of mortar or mastic, in both cases being consolidated by the introduction of liquid

cement in the joints (159). [4]

Note 4. The Persian monuments (for example the Medresses Kara Tai and Sirtcheli at Konieh (13 th century)) exhibit marvels of patient technics and veritable mastery.

At the same time, it created a delicate ornamentation by s submitting a tile to the work of the graver, which removed t the enamel in places, making the surface appear matted and w with a reddish yellow ground.

Finally, it adopted the less artistic and less durable, but infinitely more economical method of a covering of tiles covered by painted ornamentation (131; 160).

Refined artists and incomparable artisans, the ceramists of Persia and of Asia Minor (123; 131; 145; 160), [1] and to a lesser degree those of Spain, [1] created decorations of rare beauty and marvelous diaperings, as harmonious as splendid. The Persian palette was charged with turquoise blue and cobalt b-blue, yellow ochre, dark green, black and white; [2] the Anatolian with light and dark blues, green, yellow, violet, brown, tomato red and white; the Andalusian with blue, light green and brown. Frequently the gleam of enamel added yellow or g golden metallic reflections. After the 14 th centurn, Persian tiles comprised parts in relief.

Note 1. The ceramic industry especially prospered at Nicea in the 15 th and 16 th centuries.

Note 1. Known under the name of azulejos, the Andalusian tiles were common in Spain from the 13 th century, and Seville almost monopolized their manufactore.

Note 2. We borrow from M. Marcel Dieulafoy (La Vase d'Horyouji, page 12) a very interesting observation.

The composition of the Persian palette dated from the 7 th century, the epoch in which it replaced that of the ancient ceramists of Mesopotamia-Persia, charged with less rich colors and lower tones. Since China, in the second half of the 7 th century, had just introduced into Japan the taste for strong tints and warm harmonies, was not the evolution just mentioned the result of a symmetrical radiation of Chinese e esthetics toward the West?).

In the decline of the 13 th century, the Egyptian school c conceived the idea of completing the diapered polychromy of

internal surfaces by that of glass, which formed a variously colored mosaic, inserted in the openings of a plaster screen or assembled like stained glass. The innovation was fortunate in Syria and Turkey (122; 161; 162). [3]

Note 3. For example, see the stained glass of the Kubbet-es-Sakhra in Jerusalem, which date from the 16 th century. (162).

249 Mohammedan Ornamental Inspirations.

Mohammedan decoration was substantially ornamental. The Commentary on the Koran, if not the Book itself, forbids the representation of God, man and animals. Yet in Syria in the time of the Ommiades (163); [1] in Egypt from the 10 th to the 13 th centuries; in Persia in all epochs and in India of the Grand Moguls, the prohibition was transgressed. In the same places and within the same chronological limits, the floral motive was maintained in relations with nature (123; 131; 134; 157; 160); but everywhere else, the model was disfigured by an extreme conventionalization and by a composition, always strictly rhythmical, and often extremely regular and symmetrical.

Note 1. See the frescos, which decorate the Castle of Kusejr' Amra in the desert of Syria.(Also A. Musil, Kusejr'Amra).

In general, Mohammedan decoration loved the light scrolls of leaves and flowers, otherwise termed arabesques; it was also pleased by extending on long bands the elegant and picturesque Arab calligraphy of pious or commemmorative inscriptions (123; 131; 154; 155; 159; 160; 162).

Note 2. In Mohammedan calligraphy may be distinguished three types of character; the Cufic (from the beginning of the 8 th century to the middle of the 9 th), which is comparatively simple and very monumental, the Carmatic (from the last third of the 9 th to the decline of the 12 th centuries), whose angular letters flourished in sometimes excessive arabesques; the rounded Cursive (in vogue from the beginning of the 13 th century).

250 Everywhere it assigned the greatest part to geometrical ornamentation, generally treated in the style of textile decoration. [1]

Note 1. In Syria was maintained the traditions of an appearance of lace (see pages 60, 61 and 66), which was equally

in vogue in Anatolia (119), with exaggerations resulting from Armenian influences. On the nature of the latter, see page 95.

In Egypt after the 13 th century; in Morocco and Spain, it was devoted to the reproduction of drawings, that were multiplied by the passion of Arab mathematicians for the development of geometrical themes. By means of the sinkings by engraving or cutting out, the openings of perforations, contrasts of marquetry, the network of a trellis, the sculpture of stalactites, it organized combinations of straight or curved lines and of polygonal or cylindracal surfaces, producing an a appearance of crystallizations (120; 146; 154; 155; 156; 158; 161; 162; 164; 165).

This system of rectilinear or curvilinear interlacings was susceptible of combinations in unlimited number and was recommended, both by the satisfaction it gave to the abstract and dreamy genius of the East, and by a remarkable alliance of t the qualities of unity and variety. For on the one hand, it amused by its diversity, entanglement, and the mutual dependence of appearances, which changed not only as the view changed, but also whether the eye was fixed on but one mesh of t the network or comprised several; on the other hand, it possed the attraction of a rythm harmoniously cadenced, and it produced in the mind the pleasure of discovering the reality of a secret logic and a mathematical coherence under the appearance of fancy and caprice.

Note 1. Fig. 165, Yellowish gray, red, brownish black.

Mohammedan Gardens.

The decorative ideal revealed by the analysis, which we have just made, we recognize in the composition of Mohammedan gardens. It also decidedly aims toward a picturesque effect; its means are the contrast of natural appearances with an art note energetically introduced by regular plantings, by a geometrical arrangement of the plants, by outlining channels and basins enclosed by stone or ceramic borders, and by the erection of kiosks and of porticos. To the accidental monumental reliefs are added those of a modeling of the ground in terraces, of the diversified relief of the vegetation, of cascades and fountains; while to the splendor of marbles, gilding and faience composed of reflections from the quiet water and the

sparkling of that in motion. It is not only on the "embroideries" of the flower beds, that is repeated the arabesques a and the polygonal forms so dear to Mohammedan ornamentists. Let us note that the gardens of Persia and those of India of the Grand Moguls manifest the taste for harmonious arrangements, as much as the edifices; for they are balanced with reference to the axis of a grand middle avenue, furrowed by a canal and subdivided by transverse alleys (127; 133, 2;(7, 7); 166).

154 Book IV. Eclectic Architectural Styles of Eastern Europe.

It is proper to present together here the Russian, Servian and Moldavio-Wallachian architectural styles, for the reason that their eclecticism drew from the same sources, and that one of these was the Mohadmedan.

Part I. Architecture in Russia.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Influences. -- Epochs.

I. Requirements.

For a long time thinly peopled and devoted to a thoroughly rural civilization; inhabited by a citizen class, not numerous but practical and coarse, and an aristocracy more than three-fourths barbarous; besides being always undes the shock of a Polish, Lithuanian or German invasion, and from 1224 for nearly three centuries, of a Mongol or Tartar incursion, mediaeval Russia did not form a land very propoitious to the development of a brilliant and original style of architecture. The sole favorable condition realized by it was the extreme devotion of the artless people, the more attached to their r religion, because being different from that of their enemies, 155 it symbolized their national individuality and their desire to safeguard this.

Yet from the 14 th century, the Russian cities and especially Moscow were rapidly enriched by a great commerce with Asia and by an active industry. At the same time, the Muscovite state was enlarged, and Moscow took the rank and figured as the capital.

In fact, the Russian requirements had as their objects; first a multitude of churches and monarteries; then fortifications and bell-towers of the cities; but neither monumental tombs nor magnificent palaces.

II. Monumental Chronology and Topography. [1]

Note 1. For architecture in the Baltic provinces and in F Finland, see Volume III of this work.

In the decline of the 10 th century and in the southeast of the country commenced the existence of a cause for demands; then Kiev, "mother of Russian cities", was prosperous under the government of S. Vladimir (980-1015), who in 988 proclaim-

proclaimed the orthodox Christianity of the Byzantine religion as the official religion of his rtate; from that epoch dates the plan and a part of the erection of the Church of S. Basil in that city.

The first half of the 11 th century was a period of advance for the mediaeval Russia, marked by the founding of cities, by a sketched civilization, and by an active propagation of Christianity in the centre of the country. Under Jaroslav t the Wise (1019-1054), Kiev continued to grow and assumed the role of religious metropolis of the country -- of the "Russian Jerusalem"; its Cathedral of S. Sophia (1020-1037) [1] dominated four hundred churches and chapels! On the other hand, such were built at Tchernigow (Church of the Saviour); at Smolensk (Cathedral of the Assumption); particularly at Novgorod the Great, enriched by an active commerce with Europe and by the exploitation of central and northern Russia (Monastery of S. George, south of the city; Cathedral of S. Sophia (1045-1052).

Note 1. It belonged to this time by the five aisles of the middle part and the internal arrangement.

In the second half of the century, the demand lessened (Cathedral of the Assumption at Kiev (1089)). But it was resumed in the course of the 12 th; at Kiev, then in full decadence -- Monastery of S. Michael (1108); at Pskov, that the Hanseatic League caused to prosper -- Cathedral of the Trinity (about 1138), Church of the Monastery of the Saviour (1056); at Perejaslav - Zaljeski -- Cathedral of the Transfiguration (about 1155); at Sousdal -- Cathedral of the Nativity (12 th century); at Vladimir, which was founded in 1116, and developed under the impulse of Andrei Bogoljnbski (1169-1174) -- Cathedral of the Assumption, the work of that prince; Church of the Nativity (1191); Cathedral of S. Dimitri (1197). The demand continued during the first half of the 13 th century; at Smolensk -- Cathedral of the Assumption (beginning of the century); C Churches of S. Michael Archangel, S. Peter and S. Paul; at Jaroslav -- Monastery Spasso-Preobrashenskij with two churches (1216 and 1218); at Rostor -- Cathedral of the Assumption (1230), at Kostroma -- Cathedral of the Assumption (1240); at Jouriev--Polskij -- Cathedral of S. George (1234); at Tver --

Cathedral of the Transfigurattion; Monastery of Ostrotsch (middle of the century), etc.

But in the second half of the century and in the first of the 14 th, architecture suffered from the results of Mongol invasions (1224, 1237, 1242) and from the division of the country into little rival principalities.

It was resumed from the moment in which were felt the effects of the skilful and energetic politics of the great princes of Moscow, "assemblers of the Russian land"and champions of orthodoxy. Ivan Kalita (1328-1341) built in the Kremlin at Moscow the Church of S. Michael Archangel, of the Saviour in wood (1330), the Cathedral of the Assumption, which was to become the sanctuary of Russian czarism. Under the glorious Dimitri Donskoi (1363-1389) arose in the Kremlin the Monasteries of Zschudov (1358) and of the Ascension (1389); in the city those of Andronov (1366) and of Ssimonov (1370). At the end of the century, the Kremlin was endowed with a new Cathedral of the Annunciation (1397). At the same time monasticism flourished; ruined by the Tartars, the famous Monastery of Troitska, that S. Sergius had founded in 1340, was restored in larger form at the beginning of the 15 th century; that of the Saviour at Moscow was established in 1352, and in 1429 w was created that of Solovetskij on an island of the White Sea.

Yet the decline of the 14 th century and the greater part of the succeeding one were for Russia an epoch of depression, brought to an end by the reign of Ivan III the Great (1462-1 1505), the creator of Muscovite greatness. Under that prince, whom his marriage with a Byzantine princess (1472) inclined to luxury and show, the Kremlin became a workyard, from which came a new Cathedral of the Assumption (1475-1479); one of t the Annunciation (1484-1495); a festal hall, the Granovitaja Palata (1473-1490); the gates of the fortress called Nikolskija and Spasskija (of the Saviour; 1491); a Church of S. Michael Archangel (1503); besides which was built in Moscow a new Monastery of Our Saviour.

The reign of Vassili Ivanovitch (1505-1533) was in all respects a continuation of that of Ivan III, and enriched the Kremlin with A Cathedral of S. Michael Archangel (1505-1508); with another under the name of the Ascension (1519); with a

new Church of the Saviour (1527); and Moscow with a Monastery of the Virgin (1524), commemmorating the annexation of Smolensk. In 1528 was rebuilt the Cathedral of the Nativity at Sousdal.

From the time of Ivan the Terrible (1533-1584) date a Palace and churches at Kasan, conquered in 1552; the curious Cathedral of Vassili Blashenny at Moscow, the work of two Russians, Barma and Postnik; and most of the buildings of the Monastery of Solovetzkij.

Then the demand lessened.

The end of the 16 th century and the beginning of the 17 th were an epoch of disturbances and of invasion, to which belong the Tower of "Ivan the Great" in the Kremlin (1584-1598), and in the city of Moscow, the Church of the Assumption -- t the "Red Church" (between 1598 and 1605), and the Cathedral of the Trinity at Kostroma.

In the 17 th century construction languished; in the Kremlin of Moscow a Church dedicated to S. Michael Malein (1634) and a Palace, the Terem (1636); in the same city the Church of Our Lady of Kazan, commemmorating the expulsion of the Poles (1625); one of the same name at Markov in the government of Moscow; at Jaroslavl, Churches of Iljinskaya (1647-1680), Nikoly Mokrago (1665), S. John Baptist (1671-1687), Churches at Rostov etc.

The founding of S. Petersburg in 1703 produced important a architectural enterprises, which developed during the reign of Peter the Great (died 1725); the first Palace of the Admiralty (1705); Fortress and Cathedral of Ss. Peter and Paul ((1714-1733); Palace of Peterhof (1720); Monastery of S. Alexander Newsky, with a Cathedral of the Trinity (1724-1798). Lessened by a transfer of the court to Moscow under Catherine I and Peter II (1725-1730) -- a new Admiralty (1727), it was resumed in consequence of a definite reestablishment of the government on the banks of the Neva -- Winter Palace (1732-1 1764), Tower of the Admiralty (1734-1735), Cathedral of the Resurrection (1738-1835) etc.

For the provinces, we cite the Cathedral of the Assumption at Kiev in the government of Archangel; a restoration and transformation of the Cathedral of the Assumption at Kiev (1729),

Church of S. Andrew in the same city, the work of Rastrelli (1744-1767); and a Palace in the Kremlin of Moscow (1753).

III. Conditions. -- Influences. -- Periods.

Natural Conditions.

The natural and human conditions met by the evolution of R Russian architecture appeared characteristic and efficient. 260 On the one hand, a brutal climate with extremes of heat and cold, much humidity and abundant snowfalls; a ground generally poor in stone, but rich in good brick clay, and with abundant wood in the middle and northern zones. [1]

Note 1. Yet the convenient transportation by water permits in a certain measure obtaining materials from outside; thus most of the churches of Moscow are built of stone, though this lacking in that region.

On the other hand, the geographical position of Russia intermediate between Europe and Asia; its broad opening toward the second of these portions of the world; the facilities for transportation produced by its level territory, the navigability and the radiating distribution of its watercourses, predestined it to be influenced both by Asian and European arts, therefore attempting a compromise between the two, always to the advantage of the first.

Influences.

In fact, in all epochs of its history, Russian architecture was more or less tributary to foreign architecture.

And first, it borrowed from Byzantium, at the same time as its religion, the programme of its temples, the forms of its edifices and a great part of their decoration.

Still the singular resemblance of the plan of S. Sophia of Kiev to that of the Georgian Church of Mokwi (52, 5; 172, 1); the pyramidal form of certain domes; particularly the conception of the relief ornamentation of many ancient churches, attest that a Byzantine influence was strongly competed with by an Armenian influence. This is explained at the same time by the radiation of Transcaucasian monasticism; by the relations of the Russian princes with Georgian and Armenian; [3] finally, by the establishment on the Russian frontiers, of colonies of 261 fugitives from Ani, after the taking of that city by the Mohammedans in 1064 (page 85).

Note 3. Note the marriage of the prince of Vladimir, George II (1212-1228), with a Georgian princess, and that of the prince Iziaslav Mstislavich of Polhynia (died 1154) with a princess of Abkhazie.

Further, the taste of the Russians for bulbous domes and t the floral motives dear to the Persians, as well as many fraankly Asian forms of the decorations, announce a Mohammedan invasion, that must have been favored by the political dependence of Russia on the Tartars, and its economical relations with them, from the 13 th to the 15 th century. [2]

Note 2. Note the presence of Russian architects and goldsmiths at the court of the Khans of Tartary in the 13 th and 14 th centuries. Also see page 262.

On the contrary, the ornamentation of monuments of the 12 th and 13 th centuries, such as the Churches of Vladimir, Sousdal, Perislav-Zaljeski and Jouriev-Polskij, reveals Romanesque suggestions.

The intervention of the West is emphasized from the last t third of the 15 th century. Zoe Paleologus, who married Ivan III, the grand prince of Moscow in 1472, had lived at Rome, and her entrance into the Russian capital gave access to Italian architects; to Aristotile Fioraventi of Bologna, author of the existing Cathedral of the Assumption in the Kremlin; to Pietro Antonio of Milan, the constructor of the Gates Spasskija and Nikolskija, and together with Marco Ruffo, of the Granovitaja Palace; to Alessio Novi of Milan, who erected for Vassili Ivanovitch the Cathedral of S. Michel Archangel. In the 17 th century occurred an invasion of German and French formulas. In the 18 th, Peter the Great employed a Frenchman, Leblond, author of Peterhof; while the favorite architect of Elisabeth Petrovna was an Italian, Rastrelli, who introduced the "Barocco"style into Russia. (Volume III).

Yet from the middle ages, Russia manifested a real artistic genius and incontestable architectural aptitude. In the 13 th century, it furnished artists to the court of the Khans of Tartary; [2] after the 15 th, Moscow was the centre of an active and very remarkable production of jewelry, arms, embroideries and wrought leather, and the originality of the Russian monuments, before the submission of the country to western e esthetics, implies the existence of a national temperament a

among their designers.

Note 2. Note the mention made by Doplan du Carpin and Rubenquis, envoys sent to the Khans , the first by Innocent IV in 1245, and the second by S. Louis in 1258, make of Russian architects and goldsmiths, settled at Kaptchak and at Karakorum.

Now the native factor of Russian esthetics reveals to analysis a Finnish element, characterized by a particular element of the decoration; -- a Slavic element as a combination of v very practical sense, mysticism and ostentation; finally in a more geometrical way, a secular practice of carpentry. [3]

Note 3. Note what Herodotus (Book IV, 108) says of the city of the Gelons between the Don and the Volga, where everything was of wood, temples, palaces, and the enclosing walls.

Let us note that in Russia, the undertakings of religious edifices were always very largely endowed, and that those for which the czars of Moscow paid the cost, disposed of considerable means.

Epochs.

The history of Russian architecture exhibits the succession of four epochs; they are characterized; the first, corresponding to the 11 th and 12 th centuries, by a combination of Byzantine, Armenian and Romanesque influences and by a relative sobriety of style; the second, contemporaneous with the 13 th and 14 th centuries, by an appearance of luxury and caprice and by Mohammedan, Persian and Mongol intimacies; the third, synchronous with the 15 th and 16 th centuries, by a digestion of the importations and the maturing of a national style; the last -- from the 17 th century and particularly at the beginning of the 18 th century -- by a western invasion, which at first sterilized the Russian genius, and then -- in the decline of the 19 th century -- was opposed by a reaction of the native temperament.

[illegible] D. [illegible] and Their Transition. -- C[illegible]

[illegible]

I. [illegible] and Their Peculiarities.

[illegible]

[illegible] 1[illegible]) A [illegible] have [illegible] a "[illegible]" [illegible], [illegible] if a [illegible] and [illegible], all [illegible] [illegible] by a [illegible] [illegible] an [illegible] [illegible] [illegible] (1[illegible], 2, 3, 4; IV[illegible]). Poncho and [illegible]

[illegible] is [illegible] [illegible]; [illegible] [illegible], [illegible] [illegible], in the [illegible] of [illegible] [illegible], [illegible] [illegible] [illegible] (1[illegible], [illegible]).

The [illegible] [illegible] [illegible] [illegible] of [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible]

Chapter 2. Programmes and their Realization. -- C Construction. -- Effect.

I. Programmes and their Realization.

The ordinary programme of the mediaeval or modern Russian church (172) is derived from the Byzantine formula of the central basilica with dome (page 148); a square nave precedes a raised sanctuary, composed of a choir and two chapels, all t these terminated by a semicircular apse; an iconostasis conceals the holy place (172, 2, 8, 8; 178). Porches and bell t tower are common, the second being independent of the edifice, which is always orientated; frequently extend lateral porticos, in the style of those presented by certain Armenian churches (52, 4,8).

264 The rule comprises exceptions; S. Sophia of Kiev, which has four aisles (originally five), the middle one more than twice as wide as the others, and crossed by transverse aisle of the same width before the sanctuary (172, 1); [1] such again is the Cathedral of Vasilij Blashenny at Moscow, a singular group of eleven chapels in two stories around a central sanctuary, the arrangement of which recalls both the radiating and cruciform type loved in Asia Minor and Armenia (pages 72, 87), and the shape of certain pagodas (168; 172, 3).[3]

Note 1. Compare this plan with that of the Armenian Church of Mokwi, page 87.

Note 3. See Book V.

As characteristic peculiarities of Russian domestic programmes, we mentinn a composition scattered in pavilions; the projection of great bays analogous to Mohammedan mushrabiyes; t the use of porticos, further explained by the rainy and snowy nature of the climate; finally, the external position of the stairways, realized under the form of open galleries attached to the facades (173).

265 II. Construction.

In the forested regions of central and northern Russia, wood is the usual material for domestic structures (173), and in large measure, that of the religious structures of the second class (171). Monumental programmes are commonly realized in bricks or with small stones.

The covering consists of tunnel vaults, cross vaults and d

domes; the latter are ordinarily placed on high cylindrical drums pierced with windows, that form the chief part of the lighting of the interior; (168; 172, 1,2; 175; 223). The adjustment of the angles of the supporting square is obtained by means of pendentives in the form of a spherical triangle. A system peculiar to Russia, and which is recommended by a h happy combination of practical and pictqueresque qualities, constructs an octagonal dome by means of stories of arches c corbelled out from each other (174, 1,2); the imposts of the arches in one range either rest on the crowns of the lower s series (174; 3,4), or on small arches turned between the latter (174, 6).

The roofs, with very steep slopes on account of the necessity for ensuring the sliding of the snow, are of wood, tiles, or often of metal, and in case of a vaulted covering, are placed directly on its extrados (169; 173; 174).

III. Effect.

The most characteristic trait of the ancient Russian architecture was an immoderate love for picturesque effect, which accustomed it to excess of ornamentation and worse faults of taste.

No more than for qualities of harmonic order was it desirous of material greatness, the famous Cathedral of the Assumption in the Kremlin of Moscow measures inside no more than 1 124.7 ft. long and 75.5 ft. wide, and at S. Sophia of Kiev, the corresponding dimensions do not exceed 108.3 and 78.7 ft.

Nor was it more addicted to experiments in secondary relief, from which it was further diverted by the practice of construction in brick. In the fashion of Armenia, it always relieved the nudity of the external walls by slender half columns connected with the cornice, or by strongly projecting arcades as high as the edifice; both strengthening the constructing and in large measure indicating its structure (175, 1). The forms of isolated supports were heavy and mean (177).

On the other hand, it loved to impress by the general slenderness of the edifice, which was frequently higher than long;[1] (168; 171; 175, 1,2); by the height of the arcades tnat relieved its facades; by bristling slender and pointed parts [1]-- drums so slender that some almost recall minarets; domes with

ogee profiles in the Persian fashion or as acute triangles in the Armenian mode, and surmounted by lanterns, spires and points, great carved crosses stayed with chains (168; 171; 175).

Note 1. The Cathedral of the Assumption in the Kremlin of Moscow, whose greatest width outside is 131.2 ft., extends 137.8 ft. above the ground.

Note 1. Twelve domes are counted on the Cathedral of Vasilij Blashenny of Moscow; thirteen on the Church of the Assumption in the same city, and fifteen on S. Sophia of Kiev.

It loved variety in appearance, to the point that certain church roofs combine as many as four types of different domes; it delighted in complications and in singular forms, such as twin arches without a support for the joined imposts (168); roofs shaped like spindles, turnips and pinapples, modeled in facets, network or scales; spires with windows in successive stories (175, 3); arches distorted and ogee (171; 176) etc.

Particularly, it shared the taste of the East for abundant reliefs, complicated and treated with current or covering ornamentation, modeled on the flat like that of goldsmith's work and producing the appearance of monumental tapestry (169; 178).

Its polychromy had dominant red, white and green, which it harmonized in the Persian, or contrasted in the Mongol fashion; further, it wished to dazzle by a covering of reflecting materials and by a show of richness. In spite of the rigor of the climate, the external surfaces were stuccoed and painted, and the domes were adorned by vivid colors or shone with the gleam of gold or silver. In the interior were only frescos and mosaics.

The ornamental repertory comprised geometrical combinations of Finnish invention; motives in the Armenian taste, borrowed from the art of fabrics -- braids, interlacings, mats and twisted fringes; very conventionalized foliage, dry and serrate, quite analagous to those of the Syrian school (page 67); flowers -- notably roses and shrubs in the Persian style, fanciful animals of entirely oriental appearance (169; 178).

In style as in inspiration, frescos and significant mosaics were thoroughly Byzantine, imitated from types developed in the monasteries of Mt. Athos (pages 61, 66). The walls of c

centain ancient churches -- such as those of S. Dimitri at Vladimir, of S. George at Jouriev-Polskij, exhibit figures and monstrous animals, sculptured in weak relief and out of scale, in the Armenian taste or even the Romanesque (169).

Part II. Servian and Moldo-Wallachian Architectural Styles.

Section I. Servian Architecture.

I. Requirements. -- Monumental Chronology and Topography.

From 1165, the date of the establishment of Servian unity by Stephane Nemanya, until the middle of the 15 th century, the era of the definite submission of Servia to the Turkish yoke (1459), the piety of the princes and of the great paid the cost of construction of a good number of churches and monasteries in Bosnia, in Servia proper, on the one hand, and on the other in Albania and Macedonia, three-fourths conquered by them.

That commenced in the decline of the 12 th century by the orders of Stephane Nemanya (1165-1195), as recalled by the Royal Monastery (Tsarka Lavra) of Stoudenitza (1190). At the beginning of the 13 th, Stephane I (1195-1224) erected at Zitcha the Church of Ss.Peter and Paul(1219). Then architecture profited by the progress of Servia under the government of Ouroch the Great (1242-1276) -. Monastery of Gradatz, Church of Arilje, and again under that of Miloutine (1281-1321), a building prince, who is said to have built or restored forty churches -- Monastery of Gratchanitza near Uskub; of Trescavetz near Prilep; churches of Nagoritza near Koumanovo, the B Bagniska near Mitrovitza (1312-1316). It proceeded likewise in the time of Stephane Ouroch III (1321-1331) -- Monastery of Detschani betweey Ipek and Prizrend, and particularly in the time of Stephane Douchan (1331-1255), who carried Servia to the climax -- Monastery of Ss. Archangels at Prizrend; Churches of Mateitza near Koumanovno; of Liubotin near Uskub (1337); Church of the Monastery of Marko near the same city (1345); Church of the Virgin on an island of Lake Prespa (1345).

After the death of Stephane Douchan, Servia passed into decadence, torn by internal struggles and pressed by the Ottoman expansion; thus the demand was confined to Servia proper, which owed to its northern location its shelter from Turkish attacks, longer than Macedonia and Albania. [1] From that epoch date the Churches of Ravenitza (1381); of Kurczevats, built by czar Lazare (1371-1389); of Lioubostinja (end of the century); of Manassia (1407), of Roudenitza and of Kalenitsch (

(1427), works of czar Stephane Lazarevic (1389-1427).

Note 1. Yet we find the mention of the erection of a Church at Zooum on Lake Ochrida (1361), and at Emporia near Korytza (1390).

II. Conditions. -- Influences. -- Epochs.

Influences.

The architecture of Servia was subject to form influences; those of Byzantine, Lombard-Romanesque, Armenian and Ottoman arts.

192 The first resulted from the intimate political and religious relations with the Byzantine world -- marriages of sovereigns with Byzantine princesses, [1] Byzantine education of the clergy, nearly all of its dignitaries being trained at the Monastery of Chilandari on Mt. Athos, this was more energetically exerted in the decline of the 14 th century by reason of the contact of Servia with the empire, from the fact of i its expansion in Albania and in Macedonia. Because of their proximity, the churches of Salonica and of Athos served as m models.

Note 1. Those of Stephane I with Eudoxia, doughter of Alexis III, and of Miloutine with a doughter of Andronicus II Paleologus.

The second, which affected Bosnia and Servia proper [2] in t the 12 th century, the 13 th and the two first thirds of the 14 th, was favored by the economical and intellectual radiation from the ports of Dalmatia -- Zara, Spalato, Ragusa and Cattano -. and by the politics of the Nemaynes, who were careful to avoid a Byzantine protectorate and coqueted with the Papacy. [3]

Note 2. Particularly, see Stoudenitza, Detschani and Zitcha.

Note 3. Note the conduct of Stephane I, who was raised to become king, and was crowned in 1217 by a legate of the Pope, and in 1222 by his brother with a diadem sent from Constantinople !

193 The Armenian intervention resulted from both the monastic relations [1] between the Danubian provinces and the native country of S. Gregory the Enlightener, and from the Armenian i immigration into southern Russia, Poland and Moldavia (page 85).

Note 1. S. Sava (1169-1236), brother of Stephane I, the f

first archbishop primate of Servia, the great builder of the civilization of his country and of his ecclesiastical organization, visited the Armenian monasteries as well as those of Syria, Palestine and Egypt.

Finally, the Mohammedan influence resulted from the pressure of the Ottoman power.

Natural Conditions.

The soil of Servia everywhere covers hard rocks; in certain regions, it offers sandstone and limestone. Wood abounds; t the climate comprises a very considerable proportion of humidity and cold.

Epochs.

In the historical development of Servian architecture are distinguished two phases, that are separated by the beginning of the 9 th decade of the 14 th century.

The former is characterized by Romanesque intimacies; the latter by the adoption of Byzantine methods for the monumental relief and ornamentation.

III. Programmes and their Realizations.

Normally, the properly Servian church rises at the centre of a consecrated enclosure, sometimes surrounded by high walls.

In Servia proper, the usual plan comprises but one aisle, [3] and if side aisles exist, they are extremely narrow (181, 1).[4] In any way, it centres the edifice by outlining a square support beneath the dome (181; 182). As high as the nave, the sanctuary ends in a semicircular apse, closed by an iconostasis and flanked by two chapels (181, 3), more frequently by two very small apses (181, 2). At first the nave was oblong in the fashion of the West; [5] but in the 14 th century prevailed a grouped and radiating composition, which by means of lateral apses ended in a trefoiled arrangement, indicating B Byzantine influences (181, 2). [1]

Note 3. See Stoudenitza.

Note 4. See Ravanitza.

Note 5. See Stoudenitza.

Note 1. See S. Elias of Salonica and the churches of Mt. Athos (page 150).

If there is a narthex -- which is very rare (181, 3; 181,2) [2] -, it is commonly as wide as the church, and is enclosed in

its mass. It is exceptional that the programme provides for a bell tower, [3] otherwise independent of the edifice. The 1 lateral porches of the Church of Stoudenitza form an exception, indicating Western influences (181, 1; 182, 1).

Note 2. See Detschani and Zitcha. The existing narthexes are later additions.

Note 3. See Krucevatz, where it is above the narthex.

The light is scarce, being substantially admitted by the windows of the drum supporting the dome.

IV. Construction.

In Servia, the materials are stones, split into rubble or cut in blocks, and bricks. Frequently, there is a combination of rubble and bricks. Without being refined, the masonry is carefully executed. Indeed in a general way, the technics are very good.

The openings are arched in form, often circular or in rosettes (183); the doorways are generally spanned by a lintel, relieved by an arch with solid tympanum (182, 2).

The covering consists of tunnel vaults, cross vaults, half domes, circular or polygonal calottes, raised on drums (182).

The angles of the square supporting enclosure are adjusted by means of pendentives.

By reason of the comparative rigor of the climate, the vaults are sheltered by a roof of tiles with very low slopes, or by a covering of lead, placed directly on the extrados of the vaults. At Stoudenitza, the roof is masked on the facades by gables rising above it (182, 1).

V. Effect.

Servian architecture manifests taste, and in good measure, a feeling for effect, in the picturesque key. Its monuments are slender, like their Byzantine contemporaries; [1] their walls are enhanced by a substructure; by pilasters or engaged columns; by high arcades in the Armenian style; by cornices supported by arches or corbels; by splayed portals with projections; by windows coupled, tripled or in rose form (182; 183).

Note 1. See page 169. The Church of Stoudenitza is 29.5 ft. wide and extends 68.9 ft. above the ground.

Yet the mouldings are rudimentary and heavy, profiled in t toruses and bands, which are sometimes single, sometimes dou-

doubled with a narrow intermediate cavetto; a series of sawteeh often extends beneath the projection of the roof.

The pier usually consists of a cylinder set on a square plinth [1] and crowned by a low impost of mean outline; it is sometimes divided into small engaged columns; As for the columns, their proportions are heavy; their shafts are quite conical; their capitals are most frequently shaped as impost blocks with or without decoration by flat carvings, sometimes [2] in bell form in the Romanesque taste. The facade of Stoudenitza exhibits bases carved in the image of a lion, after a f formula dear to Romanesque Lombardy. In the 15 th century, shafts twisted in spiral form indicate a mohammedan influence.

Note 1. See Church of Manassia.

Note 2. See Ravanitza.

Servian architecture appears strongly occupied with ornamentation. It loves marble facings. [3] It is pleased by placink abundant sculptures on the fronts of portals and the enclosures of openings (183). Its repertory only comprises a very small proportion of plant motives, very much conventionalized; elements of regularly composed scrolls, that are sometimes a animated by conventional and symbolical images of men and animals. Its favorite motives are geometrical ornaments; for example, rosettes, often very much decorated, and particularly imitations of embroideries -- laces, plaits, mats, etc., of clearly Armenian inspiration (183).

Note 3. See Stoudenitza, Detschani and Bagniska.

In the interior, the essential factor of the decoration is fresco, treated in subject as in style according to the models offered by Byzantine painting of the 14 th century (180).[4]

See the frescos of Stoudenitza (1314), of Nagoritcha (1317) etc.

277 Section II. Moldo-Wallachian Architecture.

I. Requirements. -- Monumental Chronology and Topography.

Requirements.

When Wallachia and Moldavia were formed into principalities, the former in 1241 and the latter a century later, they were already prosperous countries, enriched by the fertility of t their soil. Yet the exclusively rural civilization, thinly peopled and frequently desolated by feudal strife, and after the 14 th century by Ottoman invasions, they would not have asked the services of architecture, if they had not assigned to religion a predominating place, in accordance with the fact, that the cross became the national rallying sign against the Turks. [1]

Note 1. Even in the middle of the 19 th mentury were counted in the two principolities 260 monasteries and 18,550 religious of both sexes.

Monumental Chronology and Topography.

In Wallachia, the demand commenced at the end of the 13 th century, incited by the establishment of the capital of the principality at Courtea de Arges in 1290; from that epoch dates the Church of S. Nicolas Domnesc in that city. In the decline of the 14 th century and during the first two thirds of the 15 th, under Mircea the Great (1386-1418) and Vlad IV (1 (1456-1462), the country ruffered too much from two epochs of war against the Turks, and in the interval from one of anarchy, for it to devote itself to building. Yet Mircea the Great erected a Monartery at Cottea and the Church of S. Spiridion at Bucharest.

At the beginning of the 16 th century, a resumption of the demand was marked by the erection of churches at Bucovets near Craiova, at Targovitche (Metropolitan Church), at Tismana (Monastery of S. Nicolas), at Courtea de Arges; the episcopal monastic Church in the last city was built at the cost of prince Neagoe Bassarab (1512-1521), was consecrated in 1517, a and is both the masterpiece of Wallachian architecture and a remarkable monument. Later arose the Church of S. Nicolas at Bucharest (1598), the Cathedral of that city (1665), the Monastery of Cotroceni near the same city (second half of the 17 th century).

The Church of Radaucz recalls the beginning of religious architecture in Moldavia, about the middle of the 14 th century; in the second half of it were constructed the Churches of the Trinity and of S. John at Sereth, of Miroutz at Suczava, capital of the pincipality after 1388. In the 15 th century, t the demand increased; Alexander the Good (1401-1435) erected the Cathedral of Souczava; Stephen the Great (1457-1504), the triumphant hero of the resistance to the Turks, was a great builder of churches at Souczava, Poutna (1481), Voronetz (14 (1488), Harlau (1492), Borzesti (1493), Husi (1495), Jassi (church of S. Nicolas) etc. The first half of the 16 th century was marked by the esection of a Monastery of S. George at Suczava (1514-1522), of the episcopal Church of Roman ((1542-1550); the beginning of the 17 th century, by the construction of the beautiful monastic Church of Dragomirna (1602); the important Church of Trei Ierarchi at Ialls was built by Basile Lupul (1634-1653) etc.

II. Conditions. -- Influences.

In spite of the severity of the climate in the northern portion of the country; the small density of the population, the mediocre quality of the workmanship, Moldo-Wallachian architecture acquitted itself very honorable in its mission. It even presents some originality, especially in regard to c construction and effect.

279 Yet it reveals Byzantine, Arcenian and Mohammedan intimacies, which are explained; the first by the radiation from the religious centre of Mt. Athos, the second by reasons already stated (pages 85, 273), the latter by the Ottoman expansion.

III. Religious Programmes and their Realizations.

The Moldo-Wallachian church (185) is composed of a single nave, which in Moldavia admits of a longitudinal development relatively considerable. It comprises lateral axes, producing a trefoil shape, and normally is preceded by a great narthex with central plan, with lateral ambulatory, open or not e externally. The sanctuary is as high as the nave, and is isolated by an iconostasis screen.

IV. Construction.

The Moldo-Wallachian architects were skilful constructors. Very rarely, they built entirely in cut stone. Their ordinary

materials were rubble or bricks, connected by good lime mortar.

Their construction is characterized by the great thickness of the walls, averaging one-fifth of the edifice; by the amplitude of the footings, and a strengthening by the aid of projecting buttresses.

Particularly, it is marked and recommended by the originality of its system of covering, generally realized by means of small bricks or cut blocks of light tufa.

A first peculiarity results from a practical treatment -- the most simple of all methods known -- of an angle trumpet of the dome on the square support, in the form of a portion of a tunnel vault placed at 45°.

A second consists of a method of progressive reduction of the span to be covered, whose application introduced three [illegible]

One of these is the attachment of arches to the faces of the area to be covered, whose masonry comprises corbelling (186, 1,2). Another is a division of the area by an arrangement of multiple ribs. A third -- the most common -- is a v[illegible] four pendentives, the square opening of the interior is reduced to that of an inscribed circumference. From four corbels projecting at the points corresponding to the middles of the [illegible] square area, set diagonally to that of the ground story, and which is furnished with pendentives, offering a support appropriate for a drum supporting a circular or polygonal dome (186, 2). Sometimes,[1] instead of four arches, eight are turned, which intersect and produce an octagonal opening (186,3).

Note 1. See the [illegible] of [illegible].

[illegible] so of reducing the opening to be covered, the top of the upper support is surrounded by two or even three corbelled courses, whose external surface forms a parallelogram; the second and third, a star with 8, 12 or 16 points.

In brief, the Moldo-Wallachian methods of covering are related to the Asian system, analogous applications of which are presented by Armenian, Mohammedan and Russian architecture ([illegible]).

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One of these is the attachment of arches to the faces of t the area to be covered, whose masonry comprises corbelling ((186, 1,2). Another is a division of the area by an arrangement of multiple ribs. A third -- the most common -- is a v variant of the method of the dome (186, 2,3). By means of f four pendentives, the square opening of the interior is reduced to that of an inscribed circumference. From four corbelsl projecting at the points corresponding to the middles of the sides of the square, spring as many arches, producing a new square area, set diagonally to that of the ground story, and which is furnished with pendentives, offering a support appropriate for a drum supporting a circular or polygonal dome ((186, 2). Sometimes, [1] instead of four arches, eight anr turned, which intersect and produce an octagonal opening (186,3).

Note 1. See the Church of Dragomirna.

With a view of reinforcing the bearing of the drum, and also of reducing the opening to be covered, the top of the upper support is surmounted by two or even three corpelled courses, whose external surfaces forms a parallelogram; the second and third, a star with 8, 12 or 16 points.

In brief, the Moldo-Wallachian methods of covering are related to the Asian system, analagous applications of which are presented by Armenian, Mohammedan and Russian architecture ((pages 90, 265).

[illegible]

[illegible] Lacking material grandness - the scale of the productions was always very modest [illegible] - Volcano-Wallachian architecture required the satisfaction of a very strong desire to impress by the picturesque virtues of [illegible] statues, of an accented [illegible], and of a secondary relief, diversified and even carried to [illegible] (Fig. [illegible]).

[illegible] of Kolmo-Notice [illegible] style, [illegible] The most careful of all, that of [illegible] by 26.5 ft. for the church, and by 42.8 ft. for the [illegible] [illegible] of these churches is as striking as typical; [illegible] in the [illegible] church of Courtea de Argeş, the nave [illegible] the sanctuary and whose width does not exceed 29.5 ft., [illegible] to nearly 59.5 ft. above the [illegible].

The prominence of transverse apses; a projection of the narthex beyond the line of the church; a very strong projection of the [illegible]; a mode of subdividing the roof into as many forms as the plan distinguishes areas in the [illegible], [illegible] to produce a [illegible], both with movement and [illegible] the [illegible] effect is [illegible] sustained by [illegible] by the projections of the [illegible], very [illegible] [illegible], twisted drums, intersection of domes by windows, [illegible] and acute [illegible] ([illegible]).

Finally, it is often perfected by the [illegible] of [illegible] ornamentation, exuberant and complicated, in which the geometrical motives are dominant, in the Armenian or Mohammedan [illegible]. The [illegible], in particular, is common for the shape of a [illegible], as well as for the modeling of a frieze; the [illegible] [illegible] [illegible] [illegible].

V. Effect.

Lacking material greatness -- the scale of its productions was always very modest [3] -- Moldo-Wallachian architecture required the satisfaction of a very strong desire to impress by the picturesque virtues of slender stature, of an accented s shape, and of a secondary relief, diversified and even carried to oddities (186; 187).

Note 3. The Monastic Church of S. George at Suczava, which is counted among the giants of Moldo-Wallachian style, is 140 ft. long and 39.5 ft. wide. The most careful of all, that of Courtea de Arges, measures inside a little less than 82.0 ft. long by 39.5 ft. for the church, and by 42.6 ft. for the narthex. For many edifices, the length does not exceed 65.6 ft. The slenderness of these churches is as striking as typical; thus in the beautiful Church of Courtea de Arges, the nave p preceding the sanctuary and whose width does not exceed 39.5 ft., extends to nearly 88.5 ft. above the pavement.

The prominence of transverse apses; a projection of the narthex beyond the line of the church; a very strong projection of the substructure; a mode of subdividing the roof into as many forms as the plan distinguishes areas in the edifice, c combine to produce a relief, both with movement and striking. The resulting effect is energetically sustained by those produced by the projections of the substructure, very projecting bands, blind arcades, flat or banded, high stalactite cornices, twisted drums, intersection of domes by windows, toothed crestings and acute endings (187).

Finally, it is often perfected by the appearance of relief ornamentation, exuberant and complicated, in which the geometrical motives are dominant, in the Armenian or Mohammedan t taste. The stalactite, in particular, is common for the shape of a capital, as well as for the modeling of a frieze; the twisted form is equally a favorite.

As for the internal decoration, painting furnished the elements.

183 Book V. Architectural Styles of southern, central and eastern Asia.

The propriety of the study in the second Division of this work, of the architectural styles of Brahman, and Buddhist India, China, Indo-China and Indonesia, Thibet, Nepaul and Mongol upper Asia, and finally Japan, results from the fact, that for the two first the epoch of nativity, and for the others that of the beginning, do not precede the commencement of the middle ages. Their grouping at the end of this volume is justified by two reasons. The common originality of these s schools with relation to those, that we have just examined, forbids interference with them in accordance with the exigencies of a strict chronology. They intercommunicate more or less; those of India act upon all others in various degrees; finally, all were directly or indirectly subjected to the same external influences, those of Chaldea-Assyria-Mesopotamia, of Achemenide Persia, of Asia Hellenized by the Expedition of Alexander, of Sassanian Mesopotamia, and finally by the same countries after their conquest by Islam. [1.]

Note 1. See Volume I, pages 120, 240, 393; Volume II, pages 6, 306.

As the exploration of Asia progresses, there are multiplied the proofs of the extent and the energy of the expansion of the arts mentioned toward the East and the Southeast of the continent. See the works of MM. Marcel Dieulafoy, Foucher, Hirth, Münsterberg, and the reports of the expeditions of E. Chavannes, Sven Hedin, d'Ollone, Pelliot and Aurel Stein.

The order of presentation of these various architectural styles has been determined by a care to manifest their relative importance and their respective positions.

Because they merit it in respect to age, duration, extensi-
184 on and radiation, we distinguish for separate examination and at first, those of India and of China, and we shall commence with the Indians, the first in date and influence.

A second Part is divided into three sections, respectively devoted to the group of the architectural styles of upper Asia, which depend on India and China; to that of the Indo-Chinese and Indonese styles, satellites of India; finally to the art of building in Japan, derived from that practised by the Chinese.

[illegible] Lucia [illegible] of Canada.

[illegible] 1. Atlantic [illegible] Ports of Canada and [illegible] Lucia.

[illegible] Title [illegible]. -- [illegible]. -- Canada.

I. [illegible].

[illegible] and the [illegible] of Canada, the [illegible] [illegible] of the country. The [illegible] of [illegible] [illegible], [illegible], [illegible], [illegible] of [illegible], [illegible] [illegible] [illegible]

185 Part I. Architectural Styles of Brahmin and Buddhist India and of China.

Section I. Architectural styles of Brahmin and Buddhist India.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Schools.

I. Requirements.

The extent and the natural wealth of India, the rare devotion of its peoples, the concurrence of several religions (Budhism, Jainism, Brahminism, worshippers of Siva, Brahmanism of those faithful to Vishnou, etc.), the luxury of the numerous sovereigns, fond of show and encumbered by revenues, the fated and rapid destriction of monuments, against which conspire a damp climate, exuberant vegetation, unstable soil, the actual carelessness of the race, the frequency of wars and of depopulation, all tend to supply architecture with multiplied and considerable demands.

By the evidence of the ruins, the secular demand must have been very small; but it is proper to recall that in the East, even when domestic construction is intended for a prince, it is not intended for duration, and that beneath the sky of India, a rlight structure in wood and bricks is eminently perishable. Rare traces of fortifications; some works of public interest; corrals, reservoirs and bridges; no tombs, unless there are exceptionally in Rajputana some commemmorative monuments (Kirtii or Jaya Stambha). On the contrary, a prodigious production of religious architecture, required by princes, communities and private persons, to create by thousands monuments for the purpose of reliquaries or commemmorating a religious event or a holy personage (Stupa or Tope); pillars ((Lat or Stambha) bearing symbols; sacred balustrades; sanctuaries in the open air (Chaitiya); temples, shelters of chaityas and places of worship; monasteries (Vihara); temples and chapels; monumental stairways (Ghats) for facilitating access to sacred rivers.

II. Monumental Chronoloogy and Topography.

Doubtless no material proof exists of the architectural production of India proper before the middle of the 3 rd century B. C. Yet the quality of the most ancient monuments known, and

also the impossibility of rendering account of certain of their peculiarities, otherwise than by the hypothesis of a partial survival of disused practices, attest the existence of a primitive art, vanished because it had built in wood under the sky of the tropics. [1]

Note 1. See what is said of this architecture in wood and crude bricks by Megasthenes, who at the beginning of the 3 rd century B. C. resided at Patna, at the court of Chandragupta, sovereign of the State of Magadha. (Bihar and grandfather of Asoka).

A rigorous chronological classification of the monuments of India is, and will continue to be opposed by the variety of production dispersed over millions of square miles; by the ignorance of the civil state of most of the monuments; by the inaccuracy of the history of the country; finally, by the difficulty resulting from the prodigious inequality of the creations of Indian art, and the frequency of restorations with a second use of the materials, for determining the age of an edifice from its style. [2]

Note 2. Dr. Gustave La Bon, who has authorized us to borrow from the admirable illustrations of his great work, Les M Monuments de l'Inde, a good number of figures of this Section, proposes the following classification:--

I. Architecture of India during the Buddhist period. (From 5 th century B. C. to 8 th century A. D.).

1. Primitive monuments of India.
   Memorial columns of Allahabad and Delhi, temples and s subterranean monasteries of Bhaja, Karli, Ajunto etc.
2. Buddhist monuments erected above ground.
   Monuments of Bharhut, Sanchi, Sarnath, Bouddha Gaya, etc.

II. Architecture of India during the Brahmin period. (From 5 th century to 18 th century A. D.

1. Architecture of northeast India.
   Monuments of the coast of Orissa (Bhumaneswar, Juggernath etc.).
2. Architecture of Bundelkund and Rajputana.
   Monuments of Khajurao, Gwalior, Chittor, Mt. Abu, Nagda, Oudepore, etc.
3. Architecture of Guzzerat. (Gujerat).

[illegible]

[illegible]

Monuments of [illegible], Elephanta, Ambarnath, etc.

[illegible]

(From the 6 th century to the 18 th century. A. D.)

[illegible]

[illegible]

[illegible]

[illegible]

IV. Architecture of Indo-Thibet.

[illegible]

Architecture of Nepaul.

[illegible]

Burmah, etc.

From the middle of the 3 rd century B. C. until the 6 th c century A. D. developed a primary epoch of the architectural history of India, characterized by the exclusively Buddhist [illegible] most ancient dates from the time, when Asoka reigned (2[illegible] B.C.) at Pataliputra (Patna), capital of Magadha (Bihar), the zealous propagator of Buddhism; there are pillars [illegible] and the enclosure of the Monument of Bodh-Gaya.

Return to the 2 nd century; the creation of the Chaitya of [illegible] and of that of Nasik in the Maharat country at the [illegible] of the Godavery, and the palisades of the Topes of Sanchi and of Bharaut; in the 1 st, that of the Great Chaitya of Karli and the Grottos for Jaina worship excavated at Khandagiri and Udayagiri. In the 1 st century A. D. may be placed the execution of the Tope of Amravati on the lower Krishna; of the Monastery of Nalanda, the Buddhist "Monte Cassino", south-southeast of Patna; to the 5 th century belongs that of the celebrated Chaitya of Viswakarma at Ellora. The most ancient Chaitya and Viharas of Ajunta are of the 2 nd century B.C.; [illegible] ally, we may place in the 6 th century the erection of the famous Monument of Buddha at Bodh-Gaya.

Monuments of Ahmedabad, Palitana, etc.

4. Architecture of the centre of India.

Monuments of Ellora, Elephanta, Ammbernath, etc.

III. Architecture of southern India.

(From the 6 th century to the 18 th century. A. D.)

1. Subterranean temples of southern India.

Monuments of Mahabellipore, Badami, etc.

2. Architecture of the principal pagodas in southern India.

Monuments of Chillambaram, Madura, Sriringam, Tripetty, Conjeveram, Bijanagar, Tanjore, etc.

IV. Architecture of Indo-Thibet.

(From 2 nd century A. D. to present time).

Architecture of Nepaul.

Monuments of Sambernath, Buddnath, Bhatgaon, Patan, Khatmandu, etc.).

From the middle of the 3 rd century B. C. until the 8 th c century A. D. developed a primary epoch of the architectural history of India, characterized by the exclusively Buddhist or Jaina origin of the demands. The evidences are rare; the most ancient date from the time, when Asoka reigned (262-225 B.C.) at Patalipoutra (Patna), capital of Magadha (Bihar), t the zealous propagator of Buddhism; these are pillars (lat) bearing inscriptions and animals, the Tope of Sanchi without its enclosure, the subterranean Temple of Rajagriha in Bihar, and the enclosure of the Monument of Bodh-Gaya.

Return to the 2 nd century; the creation of the Chaitya of Bhaja and of that of Nasik in the Maharat country at the sources of the Godavery, and the balustrades of the Topes of Sanchi and of Bharaut, in the 1 st, that of the great Chaitya of Karli and the Grottos for Jaina worship excavated at Khandagiri and Udayagiri. In the 1 st century A. D. may be placed the execution of the Tope of Amravati on the lower Krichna; of the Monastery of Nalanda, the Buddhist "Monte Cassino", south-southeast of Patna; to the 5 th century belongs that of the celbrated Chaitya of Viswakara at Ellora. The most ancient Chaitya and Vihara of Ajunta are of the 2 nd century B.C.; the others were created during the first centuries A. D. Finally, we may place in the 6 th century the erection of the famous Monument of Buddha at Bodh Gaya.

After the [illegible] th century, the restoration of Brahmanism determined a revival of Jaina, and therefore an increase in religious decision; at the same time powerful and prosperous empires were formed in Deccan as in northern India.

[illegible] state of Bahadur, whose territory extended from Nepaul to N Marhuddan, whose capital of the same name appeared to them "Sunrivaled", but was conquered by the Mohammedans of the 12 th century. About the same epoch was formed the state of Orissa, in which Neo-Brahmanism required temples by hundreds, notably from the 9 th to the 14 th centuries; the great Temple of Bhuvaneswar, erected in the 9 th and 10 th centuries a [illegible] Kanarak; Temple of Vishnu Jagganathya (Jaggernaut) at Puri; T Temples of Bhuvaneswar and of Katak, datable in the 11 th century. We further cite bridges, like that of Atharn-Nala, contemporaneous with the 15 th century and still in use.

The Mohammedan conquest, which was completed in the 16 th century by the occupation of Orissa, arrested the [illegible] 12 th century, when the intolerance of the conquerors dim[illegible] ched, occurred a revival, marked by the erection of edifices like the temple of Srindaram, north of Madura (end of 12 th [illegible] [illegible] domestic requirements of some spared princes are recalled by palaces, like those of Khalid Rana at Thitor (second [illegible] of 16 th century); Gwalior, built by Man Singh (1486-1515); Oudeypore, the work of Deyasingh (third quarter of 16 th century); Datya and of Dhoha, constructed by Bir Singh Deva at the beginning of the 17 th century; Amber (first half of the 18 th century and of Dig (middle of the 18 th century).

From the 1 st century B. C. till the 5 th century A. D., [illegible] habitants of the elevated valley of the Indus, the seat of t the realm of Gandhara, were fervent adepts in Buddhism, they erected important monasteries, of which the two best known a are in ruins, at Jamalghiri and at Takht-i-Bahai near Peshawar.

Likewise in the valley of Cashmere, there was from the 6 th to the 11 th centuries a swarm of monuments, monasteries and

After the 6 th century, the restoration of Brahmanism determined a revival of fervor, and therefore an increase in religious demands; at the same time powerful and prosperous empires were formed in Deccan as in northern India.

The first half of the 7 th century marked the climax of the state of Kanaudji, whose territory extended from Nepaul to N Nerbuddah, whose capital of the same name appeared to them " "unrivaled", but was conquered by the Mohammedans of the 12 th century. About the same epoch was formed the state of Orissa, in which Neo-Brahmanism required temples by hundreds, notably from the 9 th to the 14 th centuries; the great Temple of Bhuwaneswar, erected in the 9 th and 10 th centuries a and restored in the 12 th and 13 th; the "Black Pagoda" of K Kanarak; Temple of Vishnu Jagganatka (Jaggernaut) at Puri; T Temples of Djaipur and of Katak, datable in the 11 th century. We further cite bridges, like that of Athara-Nala, contemporaneous with the 13 th century and still in use.

The Mohammedan conquest, which was completed in the 16 th century by the occupation of Orissa, arrested the development of Brahman architecture in Gangetic India. At the end of the 16 th century, when the intolerance of the conquerors diminished, occurred a revival, marked by the erection of edifices like the Temple of Brindabam, north of Madura (end of 16 th c century), or that of Viceswar at Benares (18 th century). The domestic requirements of some spared princes are recalled by palaces, like those of Khumba Rana at Chitor (second quarter of 15 th century); Gwalior, built by Man Singh (1486-1518); Oudeypore, the work of Odayasingh (third quarter of 16 th century); Datya and of Uncha, constructed by Bir Singh Deva at the beginning of the 17 th century; Amber (first half of the 18 th century and of Dig (middle of the 18 th century).

From the 1 st century B. C. till the 5 th century A. D., b but particularly during the two first centuries A. D., the inhabitants of the elevated valley of the Indus, the seat of t the realm of Gandhara, were fervent adepts in Buddhism; they erected important monasteries, of which the two best known a are in ruins, at Jamalghiri and at Takht-i-Bahai near Peshawer.

Likewise in the valley of Cashmere, there was from the 6 th to the 11 th centuries a swarm of monuments, monasteries and

temples; as an example may be cited, as dating from the middle of the 8 th century, the Sanctuary of Martand east of Islamabad, the ancient capital of the valley.

Yet the centre and the west of northern India did not remain behind the eastern portion. In the 10 th and 11 th centuries, Bhagulpur, capital of the Chandella princes, was covered by temples, some being Jaina (Temples of Parishanath and of Ghantai), the others Brahman (Temples of Kandarya and of Mahadeva). In the region of Gujarat, particularly in the peninsula of Kathiawar and in the south of Rajputana, were multiplied the Jaina temples, on the one hand, at Satrunjaya near Palitana (11 th and 12 th centuries), and at Girnar (12 th c century); on the other, at Mt. Abu, where Temple Vimala dates from the 11 th century and Temple Tejahpala from the 13 th; at Chitor, where is seen a Triumphal Tower of the 15 th; at Panur, whose Temple was erected in the 15 th century and is most remarkable. Let us add a considerable group of tombs of princes erected at Gadeypore after the 15 th century.

Conquered after the 6 th century, Deccan sustains a comparison with continental India.

There may be distinguished a primary epoch before the 10 th century, during which important demands were made by the Pandya princes, who reigned in the eastern extremity of the peninsula with Madura as capital; by the Pallava princes, who f [illegible] by the Chola princes, who held the country between Madras and Gaveri; by the Chola [illegible] princes, who held the country between Madras and Gaveri; by the Chalukya princes, whose native country was the region of Badami in the high basin of the Krishna, and who subjected to their authority the northern half of Deccan with the western half of the country between the Krishna and the Gaveri. In the natural state -- still exceedingly m mediocre -- of the archaeological knowledge of these provinces, there may be attributed to this epoch certain subterranean Temples of Ellora:-- Dhumar Lena (Brahman, 8 th century), Indra Sabhai (Jaina, 9 th - 10 th centuries), that of Mlephanta (6 th century), those of Badami (8 th century), the Ratha of Mamallapuram (the seven pagodas) near Madras (end of 7 th century); the Temple of Kailasanatha at Gonjiveram; the cele-

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There may be distinguished a primary epoch before the 10 th century, during which important demands were made by the Pandya princes, who reigned in the eastern extremity of the peninsula with Madura as capital; by the Pallava princes, who f from Kanchi, now Conjiveram, governed the province of Madras; by the Chola princes, who held the country between Madras and Caveri; by the Cholakya princes, who held the country between Madras and Caveri; by the Chalukya princes, whose native country was the region of Badami in the high basin of the Krichna, and who subjected to their authority the northern half of Deccan with the western half of the country between the Krichna and the Caveri. In the natural state -- still exceedingly m mediocre -- of the archaeological knowledge of these provinces, there may be attributed to this epoch certain subterranean Temples of Ellora:-- Dhumar Lena (Brahman, 8 th century), Indra Sabhai (Jaina, 9 th 10 th centuries), that of Elephanta (8 th century); those of Badami (8 th century), the Ratha of Mamallapuram (the seven pagodas) near Madras (end of 7 th century); the Temple of Kailasanatha at Conjiveram; the cele-

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A Mohammedan invasion, contemporaneous with the second decade of the 16 th century, abolished the native states and ca-[illegible] recovered possession of itself and established new native regimes, at least as favorable to architectural production as t[illegible] culminated in the first half of the 18 th century, paid the cost of edifices as magnificent as the Temple of Vittoginswa-min in its capital, and that of Tampatri. The domain of the Nayyak princes, which comprised the south and southeast of t the peninsula as far as Madras, was covered by splendid monuments, especially in the 17 th and 18 th centuries; we shall [illegible] of Madura (17 th century), of Srirangam (17 th - 18 th centuries), those of Vellor (15 th century), of Perur (18 th century), of Rameswaram (15 th - 16 th centuries), of Kombakonam etc. The very curious Jaina Temples of Mudbidri in Malabar date from the 15 th century.

celebrated Kailasa at Ellora (end of the 8 th century); and the Temples of Pattadakal. In the same times flourished the first religious capital of Ceylon, Anuradhapura, which declined in the 9 th century.

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A Mohammedan invasion, contemporaneous with the second decade of the 14 th century, abolished the native states and caused a momentary depression of the structural abilities of t those countries; but soon the country south of the Krichna recovered possession of itself and established new native realms, at least as favorable to architectural production as t their predecessors. That of Vijayanagar, whose prosperity c culminated in the first half of the 16 th century, paid the cost of edifices as magnificent as the Temple of Vitthalaswamin in itr capital, and that of Tadpatri. The domain of the Nayyak princes, which comprised the south and southeast of t the peninsula as far as Madras, was covered by splendid monuments, especially in the 17 th and 18 th centuries; we shall cite the greater portion of the groups, that form the Temples of Madura (17 th century), of Sriràngam (17 th - 18 th centuries), those of Vellor (15 th century), of Perur (18 th century), of Rameswaram (15 th - 18 th centuries), of Kombakonam etc. The very curious Jaina Temples of Mudbidri in Malabar date from the 15 th century.

[illegible] Physical and Human Conditions. -- Influences. -- Schools and Epochs. -- Radiation.

Physical and Human Conditions.

With regard to the natural conditions, aside from a regime of tropical rains and instability of the soil of certain regions exposed to earthquakes, Hindoo architecture was rather favored. Stone materials abound in all India; sandstone predominates, but there are also marble, granite and basalt; forest resources were formerly as remarkable with regard to quantity, as they are still in respect to quality; particularly teak and sandal are magnificent woods.

Finally, the terraced relief of the western regions of the peninsula south of Kerbuddah, and its geological composition with thick layers of stratified sandstone were particularly [illegible]

[illegible] proposed of levied laborers, as docile as abundant. Yet the importance and the difficulty of many undertakings, the [illegible] ornamentation, which characterize all, imply the employment [illegible] and highly trained.

[illegible]

The existence of Hindoo treatises on construction, [2] whose composition is not without merit, announces a thoughtful and methodical conception of the art of building. Still Hindoo architecture was strongly affected by the mysticism and the [illegible] essential to the natural temperament, to the first a are to be imputed certain singularities in the form of edifices, and likewise their abundant and strange ornamentation, while the second was the cause of a routine fixity of procedures and of a rapid arrest of the development of the styles.

[illegible] tion of the Gulpa Gadra; the most remarkable is that of Ram Rat, of the Brahmanian school."

Influences.

Original in large measure, particularly in what concerns c [illegible], Hindoo architecture was still subjected to the en- [illegible]

III. Physical and Human Conditions. -- Influences. -- Schools and Epochs. -- Radiation.

Physical and Human Conditions.

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Finally, the terraced relief of the western regions of the peninsula south of Nerbuddah, and its geological composition with thick layers of stratified sandstone were particularly propitious for the development of rock-cut architecture.

Like all oriental styles of architecture, those of India d disposed of levied laborers, as docile as abundant. Yet the importance and the difficulty of many undertakings, the scientific construction of certain monuments and the profusion of ornamentation, which characterize all, imply the employment of very numerous professional workmen, well equipped with tools [1] and highly trained.

Note 1. Indian steel was celebrated.

The existence of Hindoo treatises on construction, [2] whose composition is not without merit, announces a thoughtful and methodical conception of the art of building. Still Hindoo architecture was strongly affected by the mysticism and the inertia essential to the natural temperament; to the first a are to be imputed certain singularities in the form of edifices, and likewisetheir abundant and strange ornamentation, while the second was the cause of a routine fixity of procedures and of a rapid arrest of the development of the styles.

Note 2. Sixty four of these are known and form the collection of the Silpa Sastra; the most remarkable is that of Ram Rat, of the Dravidian school.

Influences.

Original in large measure, particularly in what concerns c carpentry, Hindoo architecture was still subjected to the energetic radiation of foreign arts; those of Chaldean-Assyrian

Mesopotamia, Achemenide Persia, Hellenizing Asia, Sassanian Mesopotamia and Persia. The influence of Mesopotamia and of Persia was exerted by the maritime route of the Persian gulf, from the most distant times, brought by the commerce of the industrious country of the Tigris and the Euphrates. That of the Achemenide civilization was further a result of the political expansion of the empire of the great kings. As for the intervention of the Hellenistic styles, this was first occasioned by a Grecian colonization of the upper domain above the Indus, or the Punjab, commenced by Alexander, and continued after him by Hellenic princes (kingdom of Gandhara); then -- after the 2 nd century B. C. -- by the extension of the kingdom of Bactriana, which until 90 B. C. dominated the lower b basin of the Indus and the coastal region toward Bombay. Note the presence, certainly in the 7 th century A. D., of Indian merchants in the great cities of Persia, and of Arab traders in the ports of the west coast of India.

This dependence was never absolute, and the borrowings resulting therefrom all received the strong imprint of the native genius.

Schools and Epochs.

In general and without the possibility of exactly deliminating their areas and of separating their origins, six different styles may be distinguished in the architecture of India:- Buddhist, Jaina, Hindoo or Indo-Aryan, Indo-Hellenic, Dravidian and Chalukyan.

The Buddhist style substantially prevailed in Gangetic India, in central India and in the northwest of Deccan (Tope of Sanchi, Monument of Bodh Gaya and that of Bharaut; Temples a and subterranean Monasteries of Karli, Nasik and Ajunta); but its application was made in the entire extent of the peninsula (Amravati), and also in Ceylon (Anuradapura); its chronological limits are the 3 rd century B. C. and the 6 th century A. D.

The Jaina style had as its domain Kathiewar (Girnar, Satrunjaya and Palitana), central India (Mt. Abu, Ranpuh, Oudeypore, Chitor, Gwalior and Khajuraho), and it penetrated into Bengal (Parasnath) as well as into eastern Deccan (Ellora, Mudbidri and Sravana Belgola). We know it only in its mature state,

[illegible] to [illegible] will [illegible] it in [illegible]. During the [illegible] years it maintained a very [illegible] [illegible]. [illegible] [illegible] and of the 19 th century, it emerged on a [illegible] of [illegible]. There was activity recorded in the 19 th century, by a [illegible] [illegible] [illegible] to the reason of [illegible]. It [illegible] [illegible].

The Pre-Hittite or Greco-Roman style is peculiar to [illegible] and Cappadocia; it was flourishing from the 1 st [illegible] B.C. to the end of the 2 nd century A.D., and it lasted [illegible] the 3 rd century.

The Pontic or Indo-Aryan style had [illegible] as its native [illegible], where it began about the 7 th century (Sinassuan, [illegible], Amyzon and Pari); it reached as far as to the [illegible] [illegible], to Khorsabad (Assyria) and in the neighbourhood of [illegible]. It attained its climax about the 17 th to 11 th centuries, and reached its vitality until the end of the 13 th. In [illegible] [illegible], it became allied to the Jaina river.

The Dravidian style derived its name from peoples of the T[illegible] [illegible] [illegible] occupied the eastern half of Deccan south of the Krishna, [illegible] of it south of latitude 18° north. It was [illegible] [illegible] around the end of the 7 th century, had a brilliant career from the 10 th to the 13 th centuries, and a second one in the 17 th and 18 th centuries (Vijayanagar, the Seven Pagodas [illegible], Pari [illegible]). The [illegible] at Pilora [illegible] [illegible] [illegible]

which is contemporaneous with the 11 th century. During two hundred years it maintained a very high elevation, but from the end of the 13 th century, it entered on a phase of decadence, that was slightly retarded in the 15 th century by a m momentary renaissance peculiar to the region of Chitor. In Deccan it was combined with Dravidian elements.

The Indo-Hellenic or Greco-Buddhist style is peculiar to 278 Gandhara and Cashmere; it was flourishing from the 1 st century B.C. to the end of the 2 nd century A.D., and it lasted until the 5 th century.

The Hindoo or Indo-Aryan style had Orissa as its native country, where it began about the 7 th century (Bhuwaneswar, K Kanarak, Jaipur and Puri); it radiated as far as to the Himalayas, to Rajputana (Khajuraho) and in the northeast of Deccan. It attained its climax about the 10 th to 11 th centuries, and retained its vitality until the end of the 12 th. In central India, it became allied to its Jaina rival.

The Dravidian style derived its name from peoples of the T Tamil language and Brahmin religion, who employed it; its area comprised the eastern half of Deccan south of the Krichna, and all of it south of latitude 12° north. It was constituted about the end of the 7 th century, had a brilliant epoch from the 10 th to the 12 th centuries, and a second one in t the 17 th and 18 th centuries (Mamallapuram, the "Seven Pagodas", Conjiveram, Tandjore, Chidambaram, Srirangam, Madura, Vellor, Perur etc). The Kailasa at Ellora attests its expansion toward the northwest.

From the Dravidian style was detached about the 10 th century that called Chalukyan, from the name of the dynasty, which favored its progress by itr commissions. Native in western Deccan about 16° north latitude (Dharwar, Badami), it flourished during the 11 th, 12 th and 13 th centuries in the northeast of the peninsula (Hanamkonda and Worangal), as well as in Mysore (Halebid), and it was in full advance at the beginning of the 14 th century, when the Mohammedan invasion interrupted its career.

299 Radiation.

300 The architectural styles of India radiated afar over the c countries conquered by the ardent apostolate of its Brahmin

and Buddhist missionaries, for which it became a holy land, the aim of pilgrimages and the choicest domain.

Indian art penetrated into Nepaul by the routes opened toward that country by the elevated valley of several branches to the left bank of the Ganges (page 362); into Khotan, Kachgarie, Chinest Turkestan, Mongolia and Thibet, across Nepaul, and particularly by the passes into Cashmere, Afghanistan and Russian Turkestan (page 368); into Indo-China through Assam and by the sea route, whose monsoons favored the custom (page 374); into Indonesia by sea (page 379); into China by the maritime route, by upper Burmah, Nepaul and Thibet, and finally eastward through upper Asia (page 334); into Japan by the mediation of China, and by direct action in a certain measure. (Page 422) (188; 189).

After the success of Islam and the establishment of the conquerors had caused the advance of a new Indian architecture, this remained for a long time subject to the native esthetics, from which it was never entirely freed (page 208).

Even the art of Mohammedan Persia borrowed from that of Brahmin and Buddhist India (page 206), which in their turn drew from other Mohammedan schools (page 223) and from that of Russia (page 261).

f. Aquatic Programmes.

The Indian house is of the oriental type; it turns its back to the world, concealed entirely from the street, and is distributed in a number of small groups around central courts: hence it is not possible to a stranger, on walking down the lane and onwards. Like to say, is it the back of a warehouse yesterday. a building as one finds by merely opened door.

[illegible] by means of sculpture and painting, clearly indicate that [illegible] interior.

The problems of a palace was merely a development of that of a private residence, on an opening of the ground or on a multi storeys [illegible], central or artificial courts of water: [illegible] plant [illegible], with for the greater part of their [illegible] and their upper [illegible] surrounded with loggias, covered [illegible], and terminated by pavilions, rooms of moderate dimensions.

Ventilation was entirely secondary. Limited to a [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] with water. In fact, the [illegible] of [illegible] alone [illegible] space, that was obtained by the [illegible] of a [illegible] and [illegible] [illegible].

An [illegible] of water or public [illegible], [illegible] [illegible] [illegible] -- [illegible] -- [illegible] [illegible] -- [illegible] [illegible] [illegible] [illegible] [illegible], like [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] of the type shown of the [illegible] of [illegible] [illegible] of a [illegible] [illegible] [illegible] a [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Chapter 2. Programmes and their Realizations.

I. Secular Programmes.

The Indian house is of the oriental type; it turns its back to the world, comprises ordinarily but one story, and is distributed in a square plan around a central court; that is often bordered by a cloister, on which open the halls and chambers. The doorway is at the back of a vestibule verandah, d defined as the facade by widely spaced piers.

The representations of houses of the ancient epochs, presented by works of sculpture and painting, clearly indicate that their elevations comprised loggias, covered balconies and belvederes.

The programme of a palace was merely a development of that of a private dwelling; on an eminence of the ground or on a built terrace dominating natural or artificial bodies of water; behind blind facades, which for the greater part of their height had their upper zone furnished with loggias, covered balconies, and terminated by pavilions, rooms of moderate dimensions were arranged around courts with porticos. (196).

Fortification was entirely rudimentary, limited to a rectangular enclosure and not flanked, sometimes preceded by a moat filled with water. In fact, the walls were of well cut stone, but were only the natural complement of natural means of defence, that were obtained by the choice of a high and steep l locality.

As specimens of works of public interest, we cite numerous artificial lakes -- that of Oudeypore is typical -- which form precious reserves of water for the period of dryness; bridges, like that of Athara-Nala in Orissa (13 th century), which is 257 ft. long and is composed of 19 arches with spans of 6.9 to 15.8 ft. each.

The tomb of the type shown by the Necropolis of Oudeypore consisted of a substructure surmounted by a sort of kiosk with small columns and a dome, erected on a circular or square plan (125, 17).

As a realization of the memorial monument may be cited elegant triumphal arches (216, 2,3), as well as lofty and slender towers in stories, elevated on a platform and terminated by a lantern, reached by a stairway; such was that of Chitor,

[illegible] ft. [illegible] in [illegible], [illegible] [illegible] 120 ft.

[illegible]

[illegible] equipped, [illegible] [illegible], [illegible] [illegible].

[illegible] of [illegible] [illegible] [illegible]

erected by king Khomba in 1440, and which reaches 130 ft.

II. Religious Programmes.

Buddhist Programmes.

Buddhism required commemmorative monuments, sacred areas, reliquaries, sanctuaries, temples and monasteries.

The lat or stambha was a pillar or column marked by an inscription and terminated by an animal or a group of several. (199, 2,3; 209).

The circular enclosure of a sacred area consisted of a series of isolated pillars, like the fashion in Ceylon, where a circle of them was repeated two or three times, or according to the custom of India, connected by railings like a wooden fence; at Sanchi their height was 9 ft.; at Amravati they attained 14.4 ft., and at Bharaut 21.8 ft. The enclosure was interrupted at the cardinal points by a sort of projecting drums, with opposite entrances, whose exterior was indicated by a portico termed toran, and shaped as if it were a work of carpentry, the posts frequently much exceeded the lintel and were joined at regular intervals by a sort of architrave projecting laterally from them, and which were themselves connected by vertical supports. At Sanchi, the northern toran extends up to 34.4 ft. and its greatest horizontal dimension is 19.7 ft. (220).

The tope or stupa belonged to the category of built tumuluses. A circular platform was accessible by two ramps and supported a hemisphere of a smaller diameter, flattened and surmounted by a cube, above which in stories and spaced above e each other were three horizontal disks of stone (chatra), representations of umbrellas, which are emblems of sovereignty in the extreme East. The interval between the perimeters of the dome and of the plinth formed a walk, utilized by processions (197; 220).

The Tope of Sanchi, which may be taken as a specimen, was 55.8 ft. high, or 61.0 ft. including the plinth; the disks m measured 6.6 ft. in diameter with a thickness of 2.2 ft.

There exists at Bodh Gaya a variant of the type of the tope, that we have just presented; the plan is square; the monument having the shape of a frustum of a stepped pyramid, surmounted by a sort of a high pinnacle; it is repeated in reduced f

[illegible] at each angle of the plinth (1[illegible]).

The Sanchi temple was an oblong room, preceded by a lower vestibule and terminated by a semicircle; at the centre of the latter rose a miniature tope called a Jagoba, exposed to the light introduced through an opening pierced in the upper [illegible] say at Sanchi, Jer and Chenaria in Deccan and are small, [2] the preliminary hall being a little larger than the chapel [illegible] dimensions, [1] and a more complicated plan. A concentric cell-[illegible] in the interior divided it into a central nave and two narrower side aisles, connected by an ambulatory. If there be taken as an example the great Chaitya of Karli, it is observed that the sanctuary was closed at the entrance by a screen, rising to not quite the middle height of the elevation, and being pierced by a middle and two smaller side doorways. Before them extended as wide as the nave and higher than it, but of small depth, a vestibule enclosed outside by two great [illegible] and on the axis of the side aisle rose a pillar supporting [illegible] four lions [illegible] from each other (19[illegible]; 200). In [illegible], an arrangement singularly analogous to that of a [illegible].

Note 2. From 14.[illegible] to nearly 26.2 ft. long, 8.8 to 11.8 ft. wide.

[illegible] *[illegible] measures 51.[illegible] ft. wide with a depth of [illegible] ft. [illegible] the pillars are 37 in number, 7 of them in the colonnade of the ambulatory.*

The Buddhist monastery (vihara or sangharama) was realized in various ways. In the Gangetic regions, courts were arranged in the interior of an enclosure well provided with shade and basins; around them rose even four stories of small cells; in southern India, the cells were hollowed in the fronts of rectangular terraces successively receding; an arrangement w[illegible]

form at each angle of the plinth (198).

The Buddhist temple was an oblong room, preceded by a lower vestibule and terminated by a semicircle; at the centre of t the latter rose a miniature tope called a dagoba, exposed to the light introduced through an opening pierced in the upper part of the facade. These edifices were built under the open sky at Sanchi, Ter and Chezarla in Deccan and are small, [2] t the preliminary hall being a little larger than the chapel i itself. Among those modified by excavation, some have larger dimensions, [1] and a more complicated plan. A concentric colonnade in the interior divides it into a central nave and two narrower side aisles, connected by an ambulatory. If there be taken as an example the great Chaitya of Karli, it is observed that the sanctuary was closed at the entrance by a screen, rising to not quite the middle height of the elevation, and being pierced by a middle and two smaller side doorways. Before them extended as wide as the nave and higher than it, but of small depth, a vestibule enclosed outside by two great piers and with four great rectangular openings alone. The l light admitted by them into the porch passed through the great opening above them and fell on the dagoba. Before the facade and on the axis of the side aisle rose a pillar supporting f four lions looking outward from each other (199; 200). In brief, an arrangement singularly analagous to that of a Christian church.

Note 2. From 14.8 to nearly 26.2 ft. long, 8.8 to 11.8 ft. wide.

Note 1. Dimensions of the great Chaitya of Karli:-- length 121 ft.; width 45.0 ft., 24.5 ft. for the middle aisle, the vestibule measures 51.2 ft. wide with a depth of 14.8 ft. T The pillars are 37 in number, 7 of these in the colonnade of the ambulatory.

The Buddhist monastery (vihara or sangharama) was realized in various ways. In the Gangetic regions, courts were arranged in the interior of an enclosure well provided with shade and basins; around them rose even four stories of small cells; in southern India, the cells were hollowed in the fronts of rectangular terraces successively receding; an arrangement w whose memory was retained by the pyramids crowning the Dravid-

Dravidian temples (201, 1). A monastery of Gandhara combined four parts; a sacred court with a tope at the centre and niche-like chapels around the perimeter; another in which were grouped miniature topes; a third was bordered by cells for h habitation; finally a square room for assemblages and repasts. (201, 4). In regions where architecture was excavated in the rock, the vihara was subterranean, composed of a vestibule - verandah, a columnar hall, with sometimes numerous cells, and finally a chapel, that sometimes had the proportions of a true sanctuary; such, for example, as Vihara No. 16 at Ajunta, whose hall measured 72.2 ft. square, its ceiling being supported by 20 piers (201, 2,3).

Jaina and Brahman Programmes.

The plans of Jaina and Brahman temples are characterized by a reduction of the sanctuary to the proportions of a very small chapel with square plan and designed to shelter a sacred image; generally planted in the centre of a court, this shrine is preceded by a vestibule, that sometimes succeeds a porch.

Jaina Programmes.

A Jaina programme comprises on the one hand, the erection of a square sanctuary on a square plan, preceded by a hall a and a great porch, both open and columnar; on the other, the erection along the internal sides of a rectangular enclosure, of little cells occupied by statues and of single or double porticos. [1]

Note 1. At Temple Vimala on Mt. Abu, the court measures 126 × 74 ft.; the cells are 52 in number; the porch consists of 48 columns, the vestibule is about 16.4 ft. square, and the sanctuary is nearly 6.6 ft. square.

In southern India and under the influence of the Dravidian school, the verandah and the porticos were suppressed, and the chapels of the perimeter were replaced by shallow niches; this type is known under the name of basti. Sometimes the s simplification was carried farther, and what is called a betta was nothing more than an enclosure with a great statue at the centre.

The Jaina lat was surmounted by a lamp.

Brahman Programmes.

The Brahman temple was realized in three different plans,

[illegible] to eastern Deccan, and the third to western Deccan.

The Hindoo formula of Orissa comprised; substantially a little sanctuary (vimana or bara newal) and a vestibule (jagamohan), generally rectangular; secondly, before and on the axis of the rooms before mentioned, a hall for dances (nata mandir) and a refectory (bogha mandir). The group occupied the centre of a rectangular court, accessible by ornamented doorways. ([illegible], 1).

[illegible]

[illegible] of [illegible] on each side, the interior [illegible] [illegible] for the temple proper. It exten- [illegible]

Then realized by excavation in the case of a hill, like those seen at Ellora (Dhumar Jena) and at Elephanta, the Brahman temple tends to the repetition of its arrangement in the [illegible]

[illegible] ced court; an equivalent of the vimana was either formed by an apsidal chapel, or rather by a small structure behind the plan. The hill was sometimes cut vertically on three sides in order to light the interior (1.3; [illegible], 2,3,4).

Of the Brahman religious programmes as realized by the Dravidian school, two great variations are known.

The most ancient is represented by the Kailana at Ellora or [illegible]

[illegible] entrance (gopura), an enclosure of chapel [illegible] sanctuary with square plan, sometimes isolated in the midst of a larger cell by an ambulatory (pradakshina), a great columnar porch (mandara or mantapam), and sometimes with a vestibule (arthamantapam) before the two, lesions, when [illegible] was the deity of the place, a pavilion to shelter the [illegible] of the bull Nandi.

The completed formula multiplied the annexes and dependances; various [illegible] a hall (choultry) with a "thousand columns", [illegible] to shelter the pilgrims; pillars supporting [illegible] statues or [illegible]; [illegible] rooms, surrounded by basins on [illegible], which were sometimes enclosed by colonnades; portions or galleries [illegible] the enclosing walls; dwellings for the pr-

the first being peculiar to Orissa and central India, the second to eastern Deccan, and the third to western Deccan.

The Hindoo formula of Orissa comprised; substantially a little sanctuary (vimana or bara dewal) and a vestibule (jagamohan), generally rectangular; secondly, before and on the axis of the rooms before mentioned, a hall for dances (nata mandir) and a refectory (bogha mandir). The group occupied the centre of a rectangular court, accessible by ornamented doorways. (203; 204, 1). [1]

Note 1. The external enclosure of the Temple of Jagganatha at Puri is a square of 656 ft. on each side, the internal enclosure is 395 ft. square; as for the temple proper, it extends to 315 ft. with a maximum width of 79 ft.

When realized by excavation in the mass of a hill, like those seen at Ellora (Dhumar Lena) and at Elephanta, the Brahman temple tends to the repetition of its arrangement in the open air. Beyond a verandah, a great columnar hall -- it measures about 148 ft. square at Ellora -- representing the sacred court; an equivalent of the vimana was either formed by an apsidal chapel, or rather by a small structure behind the plan. The hill was sometimes cut vertically on three sides in order to light the interior (193; 204, 2,3,4).

Of the Brahman religious programmes as realized by the Dravidian school, two great variations are known.

The most ancient is represented by the Kailasa at Ellora or again by the Kailasanatha of Conjiveram, requiring a court w with monumental entrance (gopura), an enclosure of chapels, a central sanctuary with square plan, sometimes isolated in the midst of a larger cell by an ambulatory (pradakshina), a great columnar porch (mandapa or mantapam), and sometimes with a vestibule (ardhamantapam) before the two; besides, when Siva was the deity of the place, a pavilion to shelter the i image of the bull Nandi.

The completed formula multiplied the annexes and dependances; various chapels; a hall (choultry) with a "thousand columns", destined to shelter the pilgrims; pillars supporting s statues or emblems; sacred pools, surrounded by basins on terraces, which were sometimes enclosed by colonnades; porticos or galleries along the enclosing walls; dwellings for the pr-

priests and dancing girls; bazaars. It further required triumphal gateways pierced in great rectangular masses, covered by tall pyramids (gopuras) and whose volume exceeded that of the sanctuary.[1]

Note 1. The Temple of Vishnu at Srirangam measures 2820 × 2515 ft. The external enclosure -- the seventh -- is 236 × 177 ft.; the sanctuary is about 128 ft. long, about one half of the vimana and the remainder of the mantapam.

Like those of Egypt, Brahman temples lend themselves to a development by the repetition of elements, inside the larger and larger enclosures, concentric with the primitive one, with a symmetrical location of the gateways; hence the sanctuary was at the intersection of grand avenues, marked out by a series of monumental portals, whose proportions were increased by the Dravidian school as they were more distant from the centre.

As for the Brahman temple of the Chalukyan style, its plan developed the succession of a vimana, an ante-hall and an external vestibule; it announced a marked taste for a cruciform or star-shaped arrangement of chapels opening toward the sanctuary; a pavilion for the bull Nandi, a court sometimes bordered by chapels, and a monumental entrance, composed the plan. (207; 208).

It was not rare for two temples to face each other; sometimes -- the ruins of Halebid offer an illustrious example -- they were placed beside each other.

The ordinary orientation was from east to west, the entrance being opposed to the rising sun.

Chapter 8. Construction.

I. Materials.

When the ground favored this, Indian architecture freely required the execution of its religious programmes by the art of the miner and the quarryman, further practised by surprising workmen. For them it was play -- attested by the subterranean chaityas and viharas of Karli, Ajunta, Ellora etc. -- to open the front of a precipice as a portico, and to excavate in the depths of a mountain spacious verandahs, vast columnar halls, chapels and cells (193; 200; 201; 204). on the o other hand, the prodigious Kailasa of Ellora shows that they were no more embarrassed by realizing in the open air a monument by removing and sculpturing the work (209). [1]

Note 1. To realize the Kailasa of Ellora, there was excavated in the mass of a hill a rectangular court 275 ft. long, 158 ft. wide and 105 ft. deep; there was reserved at its centre with singular certainty, material for the body of a temple extending lengthwise more than 98.5 ft. and rising to 92 ft. from the ground, arranging chapels, flights of steps, a pavilion for Nandi, porticos, a triumphal gateway, two lats and two colossal elephants, and the mass intended for the temple was hollowed internally into a sanctuary, a vestibule and a columnar porch 1. See further the Ratha of Mamallapuram.

For a long time, Indian construction only employed wood, a and doubtless earth and cruce bricks. About the 3 rd century B. C., construction in burned bricks and in stone became customary.

Bricks were very well made, and stone materials were cut p perfectly; the latter were frequently of great dimensions, e even when they were of granite, as often the case in the eastern and southern regions of the peninsula. [1] Great use was made of cement and of terra cotta in the preparation of the sculptured ornamentation of edifices. In the 16 th century, the influence of Persian art introduced the use of ceramic f facings. [2]

Note 1. Thus the southern gopura of the Temple of Srirangam exhibits monolithic jambs in granite 39.5 ft. high and lintels 23.6 ft. long.

Note 2. See the Palace of Gwalior.

[illegible] joined with a [illegible]'s [illegible] of [illegible]-[illegible] [illegible] [illegible] [

Iron was much used, forged with a master's hand by extraordinary artists, capable of surprises, like that of making a solid column measuring more than 23 ft. in height with an average diameter of 1.6 ft; [3] they even knew how to protect a metallic beam from flexure by increasing its depth from the ends to the middle. [4]

Note 3. Such are the dimensions of the triumphal column, probably erected in the 5 th century A.D., which still rises 22.2 ft. above the floor of the Mosque of Koutab at Delhi.

Note 4. The beams supporting the ceiling of the vestibule of the "Black Pagoda" of Konarac (10 th - 11 th centuries), whose lengths are from 19.7 to 23.0 ft., are 7.9 ins. deep at the ends and 11.0 ins. at the middle.

II. Procedures.

Indian carpentry was very expert, skilful in framework and in the construction of great tunnel vaults; it proceeded substantially by piling up timbers, never strengthening by the artifice of triangular frames, but reinforced by diagonals.((211, 2). [5]

Note 5. See the arrangements in stone in Jaina construction (212; 213, 6).

Construction in bricks was very careful, connected by clay mortar; that in stone being very well set dry. It was believed that the protection of both from earthquakes and from injury by tropical rains was ensured by giving a considerable thickness to the walls, sometimes being enormous, such as that at least 4/10 of the mass of the edifice was reserved for the solids; the precaution was further taken to connect the blocks by iron cramps.

A typical trait of Indian construction is the application made of stone materials to methods adapted to wood. Not only were they pleased to double the facade of an artificial grotto by a wooden front with wooden ribs for its vaults -- like that to be seen today in the great Ghaitya of Karli, but they likewise constructed in stone a sacred enclosure and even a portico with mortise and tenon joints, exactly as if the material had been of wood (210; 220) !

An opening was either spanned by a lintel -- either sometimes composed of a monolith, sometimes of a wooden or even an

(213, 3; 215, 6); in the other, they reduced the span of the square to be covered by placing slabs across the angles, repeating the operation as often as required to enable the opening to be covered by one slab (213, 1,2). From that expedient the Jaina school derived a truly remarkable method, and by it realized a covering on an octagonal portico of a relatively considerable span, [1] with a no less happy appearance and a r rare stability; assuming a square colonnade with four supports at each side, an architrave was set on their tops, and further an architrave connected the two opposite columns near each corner, so as to form an octagonal frame; on it was placed a second one with sides opposite the angles of the former; this was continued until the closure could be completed by means of one block. Then by appropriate cutting of the interior w was produced the appearance of a curved dome (212; 213, 5,6; 214).

1. This attained to 32.8 ft. at the Temple of Somnath; at the Temple of Vimalo on Mt. Abu, the dimension war 27.5 ft.

For Indian vaults, the normal profile was that required by the method of corbelling, the curve of a stilted and pointed arch.

In monumental construction, the extrados of the stone covering served as the roof; wooden roofs were protected by a layer of clay forming a convex terrace (215, 1,2).

A roof constructed in the form of a series of pyramids characterizes the construction of Cashmere and of the region of Kanara toward Mudbidri (215, 3,16).

-ent of [illegible] or field alone.

The Indians adopted a more very authorities for its functions; [illegible] — as observed people in a country ex-[illegible] to [illegible], exhausting [illegible] at [illegible] and frequently [illegible] forms, to [illegible] the [illegible] as much as posses-[illegible] (Ibid; [illegible], 5,7,18). Sometimes -- [illegible] [illegible]

[illegible] by two [illegible] [illegible], but on a proportion of [illegible] [illegible] (Ibid; [illegible], 11,12).

III. Covering.

The covering was secured in wood, metal or stone; it was in the form of a ceiling, a tunnel vault or a dome.

A [illegible], it was [illegible] of wood [illegible]; the span was f [illegible] [illegible] by the [illegible] of [illegible] [illegible] [illegible] or by [illegible] with [illegible] [illegible] (Ibid, 3; [illegible], 4).

[illegible] with the functions of [illegible] and a layer of [illegible] [illegible] was [illegible] covered by a thickness of [illegible]. [illegible] [illegible] of the arches indicates a complex experience in [illegible] and varied; it generally consisted of a series of [illegible] pieces, their connections being strengthened by tenons and often further by irons at the splices; they were also made of layers of planks, whose elements were so arranged, that each joint itself between two solid layers; sometimes instead of a single [illegible], there was a group of arches in a vertical plane and connected by [illegible]. The ordinary profile was that of a [illegible] round arch, [illegible] [illegible] for the [illegible] [illegible] (2,3); Ibid, 4,7). Remained in stone, the Indian vault w [illegible] [illegible] [illegible]

iron beam; or an arch, formed by corbelling out the courses, and of horseshoe or foiled shape.

The isolated support was very appropriate for its functions; strong, rather stumpy -- as otherwise proper in a country exposed to earthquakes, extending widely at top and frequently in bracket form, to relieve the architraves as much as possible (193; 219, 8,9,13). Sometimes -- Jaina construction presents numerous examples -- these were strengthened at their middle by two oblique braces, set on a projection of the shaft. (212; 219, 11,12).

III. Covering.

The covering was executed in wood, metal or stone; it was in the form of a ceiling, a tunnel vault or a dome.

If horizontal, it was made of wooden beams; its span was f further reduced by the projections of strongly corbelled courses or by capitals with projecting corbels (211, 2; 213, 4).

A tunnel vault of wood was composed of a framework of curved arches with the functions of ribs and a layer of planks, which was doubtless covered by a thickness of earth. The construction of the arches indicates a complete experience in c carpentry and varied; it generally consisted of a series of curved pieces, their connections being strengthened by tenons and often further by irons at the splices; they were also made of layers of planks, whose elements were so arranged, that each found itself between two solid layers; sometimes instead of a single form, there was a group of arches in a vertical plane and connected by struts. The ordinary profile was that of a stilted round arch, doubtless chosen for its smaller thrust (200; 211, 4,7). Realized in stone, the Indian vault w was produced by corbelling the courses; its stability was extreme, the overhang of each block being more than compensated by a very long tail (213, 1,2). Sometimes for the system of a continued tunnel vault, there was preferred as more economical a series of arches on which was placed a ceiling.

On a square masonry enclosure, or on a group of isolated c columns, the Indian architects understood how to erect a dome of wood or stone. When they employed either material, their procedure was by piling up timbers or stones; in one case, t the frames becoming smaller as they were at a higher level;

[illegible]

Chapter 4. Silence.

Indian architecture [illegible] to silence, even to inducing [illegible]

[illegible] by the surrounding [illegible], and by an overweighed profusion of ornamentation.

1. Silence of Monuments. [illegible]

It has for place assigned by the prominence of the tops of the buildings, for lights of sight, and even single structures of the [illegible], a state, of which the most characteristic manifestation [illegible] the sky-shaped outline of the Gothic church. (Ruskin: 202, 214, 219).

The elevations are [illegible] [illegible] [illegible] by elevation on a substructure. The Indian shrines are the pyramidal [illegible] roofs are covered by a kind of [illegible] roof (Sito, (1), 1); the vimana, mandapa and gopura of the Indian temples are crowned by slender stepped pyramids [illegible] (Ibid): the principle of this arrangement was [illegible] [illegible] the mass and emphasizing it in vain. (Ibid: 2). [illegible] was again so marked by the Indian, [illegible] [illegible], which added the upper portion of their [illegible] [illegible] as a sincere tribute of a people with [illegible] [illegible] and also [illegible] in size (Ibid: 3). [illegible], 5, (1), 5, [illegible] [illegible] as a work of [illegible] with [illegible], and which [illegible] [illegible] of [illegible] (Ibid: 2; 3; 5, 1).

Since again the [illegible] [illegible], that the [illegible] [illegible] of the [illegible] of [illegible] (Ibid: 2) derive from the [illegible] [illegible] proportions, from [illegible] [illegible] by [illegible] and by [illegible] [illegible] by [illegible], as finally from the [illegible] of a [illegible] of [illegible] [illegible] the [illegible] of a [illegible] and [illegible] by [illegible].

[illegible] of the [illegible] [illegible] of [illegible] [illegible] in the [illegible] [illegible] [illegible]

321 Chapter 4. Effect.

Indian architecture sacrificed to effect, even to injuring the appearance of its productions. Its dominant purpose was to astonish, not by greatness of dimensions -- we have noted that these were very modest -- but by the success of a feat in construction, by the arrangement of picturesque effects, and by an extravagant profusion of ornamentation.

I. Effects of Monumental, General and Secondary Relief.

It had for plans accented by the prominence of the mass of the buildings, for flights of steps, and even simple movements of the facade, a taste, of which the most characteristic manifestation is the star-shaped outline of the Chalukyan school. (207; 208; 215, 10).

The elevations are distinctly rising; the monument is generally elevated by a substructure. The Buddhist chaitya and the predravidian sanctuary are covered by a sort of reversed ship (215, (1), 1); the vimana, mantapa and gopura of the Dravidian temple are crowned by slender stepped pyramids (190; 194; 205); the principle of this arrangement was adopted by the Chalukyan style, which modified its application by truncating the mass and outlining it in steps (207; 215, 10). The tendency was again emphasized by the Brahman, Hindoo and Jaina schools, which shaped the upper portion of their edifices, sometimes as a slender frustum of a pyramid with faces curved upwards and also sometimes in plan (192; 203; 215, 5,8,9), s sometimes as a sort of cylinder with oval top, and which bears the name of sikhara (192; 203; 215, 5).

Note again the theatrical appearance, that the sacred stairways on the banks of rivers (ghat) derive from the amplitude of their proportions, from their interruption by terraces and by bastions crowned by small structures, and finally from their background of a screen of walls having the appearance of a facade and preceded by shady porticos.

One of the characteristics of Indian architecture is the c care, it has always taken for a picturesque presentation of
322 its monuments; it excels in selecting improving or pleasing
323 sites, elevated and isolated positions, surroundings enhancing
324 them.

The secondary relief contributed to the same effect by the

multiplication of ascending lines, notably on the sikhara, f from the surface of which project great vertical sides (192; 203); by projecting gables, festoons and flowers; by pointed pinnacles (190; 192; 196; 198; 215, 8,9; 220). The crown of the sikhara is known by the name of amalaka, and it merits p particular mention; it is the exact equivalent of a flattened and strongly ridged melon, set on a stem with hollowed profile and surmounted by a depressed dome, whose summit bears a pointed motive, quite similar to a vase (192; 203; 215, 5). Note further the outlines of blind arches, which count in the number of typical traits of Indian architecture (211; 215, 1,2).

Another category of picturesque effects, dear to the art of India, is that caused by the plays of light. They were required from arrangements of porticos or of galleries enclosed by pierced and perforated slabs (190; 194); from a very contrasted modeling of the internal and external surfaces, aiming to produce both deep cavities and strongly projecting reliefs; in that respect, simulated niches are particularly typical, and form one of the characteristics of the pyramids placed on the mass of buildings in southern India (190; 191; 194).

In the same order of ideas, it is again proper to mention the long pendant keystones of Jaina domes (214), and also to cite the enormous cornices and very projecting bosses, particularly loved by the southern schools (203; 207; 209; 217). Finally, recall the procedure already noted, of the authors of Buddhist chaityas in arranging a fall of light on the dagoba, with a view of the theatrical contrast of its illumination with t the gloom prevailing in the temple (200).

II. Effect by Relief of Details.

The Indian form of the isolated support was influenced both by a secular practice of construction in wood; by the knowledge of foreign formulas; finally, by an innate predilection f for relief with movement, sumptuous decoration and a varied appearance. In a general manner, it was that of piers rather than of columns, and its effects were not in proportion to t the effort, that it cost.

In very large measure, it depended on the styles native to Hellas and Achemenide Persia.

The schools of Gandhara and of Cashmere were exposed to ra-

radiation from the Hellenizing civilizations of central Asia, and adopted the Grecian orders, but modified their character. Cashmere has revealed columns of Doric or rather of Tuscan s-shape, placed on a base, and whose echinus is detailed in the image of bells with opposed foliage (218, 1,2); while in Gandhara has been discovered a very faithful representation of t the Ionic order and an adaptation of the Corinthian formula, that would be said to be in the Latin or Byzantine taste (218, 3,4). A capital found at Patna is related to both the type of the head of a pier or ante realized at Priene and at Miletus, and to the Achemenide Persian type; to the former by its outline and by certain details; to the latter by the sculpture on its lateral faces, of two volutes in opposed directions. (218, 5).

The imitation, if not the entirety, at least of certain elements of the Persian capital, was general in Buddhist India until about the 5 th century A.D., and many compositions of piers and columns; much later than the end of its vogue -- for example, found in the Chalukyan temples of the 12 th century -- attest that for a long time was loved the appearance of the inverted bell. The theme of the crouching bulls equally obtained the greatest success, sometimes directly adopted, sometimes differenced from the original by the choice of other animals (200; 218, 6 - 10).

The extraordinary variety of forms imposed on the isolated support by the exuberant and fanciful imagination of India, defies systematic classification. At most can be gleaned some sketches of method; a frequent shape of the capital, either as a very long cap or a group of consoles (219, 8,9,12,13); superposition of a small column on a larger one, common in t the Jaina school (212; 213, 6; 219, 12); the turning -- characteristic of the Chalukyan style -- of baluster columns in the image of piled blocks, of disks profiled as toruses and of swelled cushions, with which are frequently associated cubes (219, 3); modeling of a square pier by chamfering the angles of its middle elevation, so as to create the appearance of an o octagonal shaft between square base and capital (219, 8,13); all peculiarities expressing the survival in stone architecture, of conceptions suited to carpentry. There are again ty-

typical, the bulbous and rectangular form, that first competed with and then ousted the Persian bell (193; 219, 5); the slight concavity of the flutes of the shafts (219, 2); the taste of the Dravidian school for placing a little column before a pier as the support of a console capital (219, 14); t the erection of a column on the body of an animal (219, 10); the very ingenious solution proposed from about the 6 th century by the Buddhist and Jaina schools for the problem of harmonizing the square plan of the abacus to the circumference of the shaft; the latter is surmounted by a solid in the form of a vase, from the top of which fall long crisped and serrate leaves, or against it are placed four little winged figures, which appear to support the angle projection of the abacus (219, 1,2,7). Finally, note the fantastic and disorderly reliefs of the richest pillars of the Dravidian style; some being piles of square blocks, prisms, profiled cylinders, hollowed and roughened (219, 14); others being masked by images of elephants, of riders on rearing horses, and of modeled monsters, which appear to perform the function of a support(222).

III. Effects of Ornamentation.

Hindoo architecture brought a diseased ardor to the pursuit of effects of ornamentation.

It sought for these the materials, concealing the brick mass of a tope beneath a shell of well cut stones, and that of a temple under a covering of plaster or a facing of cement or of terra cotta; building when it had opportunity entirely in marble as on Mt. Abu, or entirely in granite as in Orissa and eastern Deccan.

The sky of India gives the color tone. Hindoo architecture lavished this. The Tope of Sanchi was entirely painted as w well as the barrier and the gates of its enclosure; the description that the Chinese pilgrim Hien Tsang gave of the Monastery of Nalanda, indicates that the columns, beams and balustrades "shone with all the colors of the rainbow", and that t the glazed tiles were polychromatic. Red predominated. Finally, on the internal walls were developed great frescos, whose remains are still preserved by certain temples of Ajunta. (221).

Hindoo architecture had a passion for sculptured ornamenta-

ornamentation, and in all the force of the term made jewelry in stone; thus it was normal for all the surfaces of an elevation to be treated as a simple field, and from the base to the top were arranged without repose successive interrupted friezes (190; 207; 212; 214; 217; 220; 222). [1] By profusion it not only compromised the monumental character of its edifices, but again created appearances of disagreeable confusion, and condemned itself to practical execution. It is always p proper to admire the prodigious variety of invention, which never repeated itself; the mastery and often the artistic qualities of a work, which -- like the sculptures of Mt. Abu -- derived from marble niceties, that one would believe to be reserved for metal (212; 214), and excavated granite as men have rarely done soft stone; finally, the marvellous beauty of certain details.

Note 1. At the Chalukyan Temple of Halebid are 10 successive friezes, each being about 710 ft. long and entirely covered by ornaments and figures; a procession of elephants numbers no less than 2000 figures.

The ornamental repertory of India comprises but a very small number of ornaments of geometrical order, such as disks, interlacings, plaits, scrolls, whirls and beads, mostly of Persian or Hellenic importation. On the contrary, there was a c considerable collection of motives inspired by plant or animal nature, of which several truly possess a symbolic value; lotus flowers above each other in the Persian fashion; rosettes and scrolls, often of extreme richness; elephants, lions, tigers and horses; persons acting and playing scenes in current life, hunting, war, worship, taking the parts of heros of the sacred legends; many cavaliers and bayardesses. Great s space was devoted to animal or human monsters, almost always grimacing. Finally, the themes of religious import consisted of holy images, particularly multiplied by Brahman programmes, and of emblems, a category to which Buddhists were restricted until the 15 th century A.D.; there was a representation of the sacred balustrade, a sort of blind arch, equivalent to the outline of a tope, the cross and the mystic wheel (swastika, chakra), the trident (trisula), the tree of life (horn), the conventionalized image of expansion like a fan of the soma or date palm, between two birds facing each other (220).

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Section II. Chinese Architecture.

Chapter 1. Requirements. -- Monumental Chronology and Topography. -- Conditions. -- Influences. -- Radiation.

I. Requirements.

The scarcity of Chinese monuments, which is explained by the fragility of constructions in wood, the frequency of earthquakes, the absence of the idea of maintenance among the Chinese, and finally the vandalism of the civil wars, only signify that there may not have been in eastern Asia an abundant production in the art of building.

China was very early civilized; the race was always devoted, and on many occasions, a government with power and resources could multiply demands of a monumental character like those of a useful order.

The successive beginnings and vitality of several religions -- astral worship; worship of ancestors; Taoism, preached by Lao Tseu at the end of the 6 th century; the gospel of Confucius a century later; Buddhism, introduced officially in the year 67 A.D. and declared the state religion in the 6 th century, Lamaism, which is a variety of Buddhism; finally, Mohammedanism, imported into Canton at the beginning of the 7 th century and widely diffused after the 13 th century, -- have always maintained an important demand for religious edifices and for monasteries. [1]

Note 1. Travelers are always astonished by the prodigious number of pagodas, that they find in all regions of China.

Likewise secular architecture was always demanded by a wealthy citizen class, anxious to be preasantly lodged; by an aristocracy, interested in ostentation; by luxurious sovereigns, requiring magnificent palaces for summer and winter and imposing tombs. It was further put under contribution for the erection of a multitude of monuments commemmorating an event or an official or private person; for the realization of edifices of public interest, such as universities, observatories and administrative buildings; for the erection of fortifications, whose importance is indicated by the Great Wall, opposed to Tartar invasions in the decline of the 3 rd century B.C.; for the construction of bridges, the digging of canals, etc. Finally, a firm belief in a survival under condit-

conditions analagous to those of actual existence, created in all times the necessity for a funerary architecture.

II. Monumental Chronology and Topography.

To the dynasty of Hia (22 nd to 18 th centuries B.C.), Chinese annals give the honor of great public works and of important structures. Likewise for the dynasty of Tcheou (1122-1 1149 B.C.); its history mentions the execution of considerable fortifications and the establishment of architectural rules, an indication of the place then held by the art of building in the Chinese civilization; note that under the Tcheou, the propagation of the religions of Lao Tseu and of Cunfucius were favorable to religious architecture.

The Great Wall, work of the emperor Ts'in Chi Houang Ti, reveals the energy in undertakings and the constructive abilities of China in the last quarter of the 3 rd century B.C.

The epoch of Han, which began with the 2 nd century B.C. a and ended in 221 A.D., was for China an epoch of prosperity and of architectural demands; we recall the imperial Palace of Loi, erected at the beginning of the 2 nd century B.C.

The 5 th and 6 th centuries A.D. were particularly favorable to the development of the art of building as a result of the great advance of Buddhism. In that epoch, Nankin possessed a great imperial Palace, which was destroyed in 598.

Civil architecture benefited by the prosperity and spirit, that the celestial empire owed to the dynasty of Tang (618-9 906). At the same time occurred a revival of the religious demand, on the one hand resulting from a development of Buddhist fervor in consequence of the immigration of Hindoo monks driven from their own country, and on the other to the introduction of Mohammedanism (7 th century).[1] The Tang epoch marks the climax of Chinese architecture.

Note 1. From the 7 th century dates the Temple of Celestial Concord near Pekin; from the end of the 8 th century, the Pagoda of Ling Kouang-Tseu. The Mosque of Holy Memory at Canton was erected in 629 and rebuilt at the middle of the 14 th century.

After a period of disturbance, the epoch of the Song emperors (960-1127) arranged for Chinese art a time of brilliant flowering southof the Yang-tse-Kiang.[2]

Note 2. Marco Polo has expressed in the story of his journey the admiration inspired in him by the Summer Palace, constructed of bamboos for the princes Song in their residence of Kai-fong-fou in Honan, and that the Mongols removed and rebuilt at Tchang-Tow, their capital.

Meanwhile in northern China, the Khitai Tartars came from Manchuria into the region of Pekin, and founded there in the 11 th century a capital named Yen. In the second quarter of the succeeding century, it was replaced by another city, Tchang-tseu, the seat of the Kin dynasty of the Niu-tchen Tartars. From the end of the 12 th century dates the marble Bridge of 24 arches over the Houang-ho, which excited the admiration of Marco Polo.

The Mongol occupation -- accomplished at the beginning of the 13 th century -- did not injure Chinese architecture at all. Northeast from Dolonnor at Kai-ping-fou still exist important remains of the Summer residence of the Mongol emperors. In the third quarter of the 13 th century, Khoubilai-Khan, founder of the Mongol dynasty of Yuang, built for himself near and northeast of Tchang-tou a capital, Ta-tou (Khan-balik), surrounded by strong walls with monumental gates and furnished with a great Palace (1264-1267). Monuments like the Gate of Kiu-Yong-Kouan in the Great Wall, which dates from 1 1345, show that in that epoch architecture was neither neglected nor degenerate.

The expulsion of the Mongols and the restoration of a Chinese empire by Hong-ou in 1368, founder of the Ming dynasty, was the occasion of numerous, varied and considerable works. The reign of Yong-lo (died 1424) was marked by constructions at Pekin, where the sovereign established himself in 1409, a and in the vicinity of that city; fortifications of the "Tartar city" (1420); Imperial Palace, completed in 1421; Palace of Examinations (Kung-yuan); great Temple of Heaven (Tien-t'an) 1421; Reliquary of Buddha, the Wout'a sseu; Tomb of the Sovereign, about 31 miles north of the city, the first in the Ming Necropolis. About the same time were erected north of Nankin the Mausoleum of Hiao-ling (1398), the first Ming, and in the same city the "Porcelain Tower".

Note the erection in the 16 th century of the Temple of Ag-

Agriculture (Hsien-nung-tang) at Pekin, and of that of the g goddess Kuan-yin on the island of P'u-t'os-han south of Shanghai (1581); the construction in the 17 th of a capital for t the new Manchu dynasty of Tong-King near Liao Yang (1616-1626), of imperial tombs near that city (1624), of a Palace at Moukden (1637), of the Yellow Temple (Hoang-sseu) near Pekin (1651), of a Summer Palace for the emperor K'ang-hi northwest of Pekin (end of the century). The 18 th century is recalled by the Summer Palace and the Temple erected by K'ang-hi at Jehol (about 1703); by a reconstruction, at the cost of the same sovereign, of the before mentioned Temple of the island of P'u-t'os-han (1705); by various Palaces of the forbidden city at P Pekin, by a Summer Palace northeast of the capital, the work of the emperor K'ien-Long (1636-1796).

III. Natural and Human Conditions. -- Influences. -- Radiation.

Chinese architecture disposed of abundant material resources; various stones; ordinary woods, and in the southern provinces, precious woods, among which was cedar; great reeds for a singularly practical use. Besides it benefited by facilities in transportation, resulting from the existence of great river routes and numerous canals; by the professional aptitudes of one of the most industrious of races; by perfected tools; also by the necessity of Adapting itself to the diversity of a contrasted climate, alternately very rainy and very warm.

Its advance was opposed by the essentially rural character of Chinest civilization, by the existence of sumptuary laws, by the moderate predisposition of the Chinese to delayed hopes and vast thoughts, and finally by a love and feeling for nature, which made them prefer the appearance of a successful garden or of a beautiful site to that of a monument.

An essential characteristic of Chinese architecture is the monotony of its types and the fixity of its methods; these a are consequences of a thoroughly positive mental disposition; of a certain poverty of imagination, of a minute and narrow formalism, and of a traditionalism without parallel in history. [1]

Note 1. The rules established by the ritual of Tcheou ((1122-249 B.C.) for public and private structures are still

sources today!

national tests the various borrowings from foreign countries.

Without speaking of the very ancient Mesopotamian influences, the relation from central and southern Asia to the extreme East was considerable. By their commercial relations with the East of the continent,[2] and by the intermediary of the Persians (138-50), [1] the Chinese acquired a knowledge of the Achaemenide Persian formula [2] and of colonial Hellenism, which flourished in the kingdom of Tashkent, Ferghana, Kashgar and in Bactriana. [3] The Buddhist propagation and their experiences for pilgrimages in the native land of Buddha, [1] revealed its end of Hellenic India (pages 288, 297), and on the other hand of Mount Imaus 2001. The Hellenic Tyrans [illegible] ion between 150 and 1889, of the two countries under the authority of the Mongol emperors. Finally, doubtless to India, China owes the principle of construction in wood and the prototype of its system of roofing. (See 351).

Note 3. These relations were established by the "silk road", which placed in regular communication Lan-sou and Kasgar, [illegible]

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the conquest in the 1 st century A.D., of the regions of Loh Kir and Turfa by the Chinese general Pan Tchao.

Note 1. See the Encyclopedia of the Buddhists and of Buddha and of Buddhism. (See M. Grousset, Les Kitlerre Tunscrines de Kirghiz Tunis)

Note 2. See Pages 1. Iran Gran.

*Note 3. See the Encyclopedia of Buddhists in Japanese or in Chinese, or in Sanskrit, or in Pali, or in Tibetan, or in Mongolian, or in Russian, or in Sanskrit, or in Chinese, or in Japanese

applied today 1

In very large measure, the impulse of the development of C hinese architecture was native, and it always adapted to the national taste the various borrowings from foreign countries.

Without speaking of the very ancient Mesopotamian influences, if not materially proved but at least more than probable, the radiation from central and southern Asia to the extreme East was considerable. By their commercial relations with t the West of the continent,[2] and by the intermediary of the Y Yne-schi, who were driven from Kan-sou by the Huns in 165 B.C, then possessing themselves of Turkestan, Afghanistan and the Punjaub (163-60), [1] the Chinese acquired a knowledge of the Achemenide Persian formula [2] and of colonial Hellenism, which flourished in the kingdoms of Bactriane, Sogdiane, Arachosie and in Gandhara. [3] The Buddhist propagation and their eagerness for pilgrimages in the native land of Buddha, [1] revealed to them, on the one hand, the religious art of Hellenizing India and of Gangetic India (pages 296, 297), and on the other, that of Nepaul (page 362). From Sassanian Persia came models and suggestions of a decorative order. Note that communications between China and central Asia were favored by the reunion between 1280 and 1368, of the two countries under the authority of the Mongol emperors. Finally, doubtless to Insulindia, China owes the principle of construction in bamboo and the prototype of its system of roofing.(Page 351).

Note 2. These relations were established by the "silk route", which placed in regular communication Kan-sou and Mesopotomia by Gobi, Kashgarie, Turkestan and Persia. (ee page 374.

Note 1. See the mission of Tchang-k'ien, sent to the country of the Yue-tchi by the emperor Wou-ti (140-87 B.C.) and the conquest in the 1 st century A.D., of the regions of Lob Nor and Tarim by the Chinese general Pan Tch'ao.

Note 2. See the discoveries of the missions of E. Chavannes and of Ollone. (See M. Dieulafoy, Les Milieurs funeraires de Ta-tcheou fow).

Note 3. See pages 5, 296, 376.

Note 1. See the relations of pilgrimages of Fa-hian (5 th century), of Soung-Yun (6 th century), of Hiuen-tsang (7th c century), of I-tsing (7 th century); the official missions to

Magadha of Li-i-piao (643-645), of Wong-hiuen-tse (646-648 a and 657-661); the official relations of the Chinese empire w with Ceylon in the 5 th and 8 th centuries etc.

On its own part, Chinese architecture impressed those of T Thibetan Asia (page 370) and of Nepaul (page 362); of Indo-C China (page 378), where from the 3 rd century B.C., the Chinese were masters of Annam; of Japan (page 426), and finally of Europe, which in the decline of the 18 th century was infatuated with the "Chinese garden". (Volume III).

Lesson 1. Performance and their Realizations.

Behind or relations, the principles discovered by the Pur-
uma architecture are accordance and rather been.

1. Symbolic Programmes.

Each of the house is determined in very great measure by t
the land. Full according to the condition of the proprietor
and the budget of the building, and by a system of Brahmin
[illegible] Dwellings, [illegible] and
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]

Chapter 2. Programmes and their Realizations.

Secular or religious, the programmes elaborated by the Chinese architecture are monotonous and rather mean.

I. Domestic Programmes.

That of the house is determined in very great measure by t the laws, that according to the condition of the proprietor fixes the dimensions of the dwelling, the number of columns and the height of the building, and by a system of geomancy (Feng-choui), which determines the site, orientation, and the proportions best adapted to ensure to the owner the aid of favorable spirits and forces. Isolated from the street by a w wall and frequently by a court, the habitation comprises a f front portico, intended for life with friends; a rear part, frequently separated from the former by a court and reserved for domestic existence; finally the offices relegated to the rear or sides. The main building, with an open veranda extending before its facade, was often developed along the four s sides of the plan, communicating by covered corridors. There is sometimes a second story (225; 226).

An imperial palace differs from a private dwelling only by an amplitude of proportions, which assimilate it to a city, by greater dimensions of the buildings, by their elevation on terraces, often in several stories, by the height of the roof, and finally by a regular and symmetrical distribution of the elements around vast courts, accessible by gates of honor. T The entirety -- termed the purple city because of the colors of the enclosure -- forms a rectangle, within which another and concentric one limits the palace proper -- the yellow or forbidden city. This comprises halls (tien) for great ceremonies (228); buildings (kong) for the exercise of the various functions of the sovereign; mansions for the lodging of himself and his family; treasuries, archives and libraries; a temple of ancestors and other sanctuaries. Around the yellow c city are grouped the residences of the great dignitaries, officials, domestics and guards; storehouses etc. (227).

Written and graphical documents inform us, that about the beginning of the first thousand years B.C. and for long afterwards, an imperial palace possessed a colossal tower in several stories (t'ai), crowned by a pavilion, sometimes reached

of a [illegible] they account the [illegible]. In [illegible], the survivors [illegible]

[illegible] (Lake [illegible]) [illegible]

[illegible] the [illegible] of [illegible] and of [illegible] [illegible], to [illegible] the [illegible] of the [illegible] and the [illegible] of the [illegible].

The [illegible] [illegible] [illegible] [illegible] with [illegible] and [illegible]. The [illegible] [illegible] [illegible] the [illegible], [illegible] [illegible] in the [illegible] of [illegible] and of [illegible] [illegible] (Lake [illegible]).

[illegible]

[illegible] [illegible] is as [illegible] [illegible] [illegible], and it [illegible] [illegible] the [illegible] of the [illegible] [illegible] to the [illegible] of the [illegible]. In all [illegible], it [illegible] [illegible] [illegible], and for the [illegible] of the [illegible], and [illegible] the [illegible] for the [illegible] of the [illegible] [illegible]. [illegible] [illegible] with little [illegible] [illegible] [illegible] with a [illegible] [illegible] [illegible] is [illegible] to a [illegible] [illegible], to an [illegible] [illegible] a [illegible], to [illegible] [illegible] a [illegible], [illegible] of [illegible] [illegible], or [illegible] to [illegible] at the [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] in a [illegible], [illegible] [illegible] under a [illegible] or in the [illegible] of a [illegible], an [illegible], a [illegible] and [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] on the [illegible] of a [illegible] [illegible], [illegible] by [illegible] [illegible] (Zur).

[illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [

by a spiral ramp around the nucleus; in brief, the equivalent and doubtless derived from the Mesopotamian ziggurat (229).

A sort of masonry screen (tchao-p'ing), forming a panel more or less ornamented, erected between a base and a roof, precedes the gate of the houses of notables and of official buildings, to indicate the rank of the proprietor and the purpose of the edifice.

The Chinese design their summer residences with love and s success. The garden there determines the structures, scattered in the verdure in the form of pavilions and of multiplied kiosks (page 355).

II. Funerary Programmes.

Funerary architecture in China is as strictly regulated as domestic, and it must proportion the development of the programme to the condition of the deceased. In all cases, it distinguishes two parts; one for the place of the corpse, and t the other for the performance of the funerary ceremonies. P Persons with little means must content themselves with a pit beneath a mound and an erect stone with an engraved prayer; a notable person is entitled to a miniature tumulus, to an altar beneath a pavilion, to steles set beneath a tortoise, emblems of eternal happiness, or even to antes at the ends of the wall enclosing his domain (230). Finally, an emperor is lodged in a vault, constructed under a tumulus or in the side of a hill; an altar, a temple and gates of honor succeed each other before the sepulchre on the axis of a rectangular enclosure, shaded by great trees (231).

In the matter of fortifications, the Chinese never passed beyond the elementary conception of the simple wall. [1]

Note 1. The different forms presented by the Great Wall, according to whether it rises in the plain or in a hilly region -- a wall in the first case and a slightly elevated terrace in the second -- is explained by Commander d'Ollone in t the following fashion; in a flat region, it must present an obstacle to the incursions of the nomads; in a hilly country, it both formed a rampart and a road for the rapid transportation of troops.

In regard to civil engineering, their bridges merit mention; some count no less than 17 arches, and that forming the "Hump-

"Humpbacked Bridge"in the park of the Summer Palace at Pekin has a span of 28 ft. (238).

III. Religious Programmes.

The religious architecture of China realized religious monuments and edifices.

Among the former, which are Buddhist, there are those -- s such as the Pe-t'asseu at Pekin or the Wou t'asseu near the capital,-- which are more or less faithful representations of the celebrated Reliquary of Bodh Gaya (page 303), at the centre of an area enclosed by a balustrade and accessible by a gate of honor, a doubled square terrace supports a central p pyramid, flanked by four smaller satellites at the angles. Much more numerous are pagodas, lofty towers with 3, 5, 7, 9 or 13 stories, symbolical of the heavens, that Buddhist theology superposes above the earth, the plan is generally octagonal; [1] it sometimes varies from one story to another, at first being square, then octagonal and lastly circular (239; 241, 2, 3; 242). [2]

Note 1. It was chosen for the famous "Porcelain Tower of Nankin, whose height was between 196.9 and 229.7 ft., for a width of about 98.4 ft. at the base.

Note 2. As an example may be cited the Pagoda of Yuan Ming Yuan in the Summer Palace at Pekin.

The second category of religious monuments of China comprises altars for the official worship and Buddhist, Taoist and Mohammedan temples.

Analagous to the Mesopotamian ziggurat, from which it is perhaps derived, the Chinese altar is formed by three circular or square terraces in stories, profiled in steps, enclosed by balustrades and accessible by stairways located to face t the cardinal points. Sometimes -- as at the Temple of Heaven at Pekin -- the upper one is uncovered, sometimes -- thus at the neighboring Temple of Prayer for the Year, it is shelterd by a structure. [3]

Note 3. The Altar Yuan-t's of the Temple of Heaven, which is on a circular plan, measures 206.7 ft. in diameter at the base, 88.6 ft. at top, and extends to 230 ft. from the ground.

Taoist or Buddhist, the programme of a Chinese temple is a variation on the theme of the house, complicated by some det-

details imported from India; its elements follow in line on the main axis of a rectangular enclosure orientated from south to north, and are separated by courts. A gate of honor f forms a vestibule and gives access to a primary rectangular court, at the centre rises on a substructure the sanctuary, sheltering the holy images and generally preceded by a veranda; at the sides are found galleries and square pavilions containing bells, and towers. Behind that area is frequently f found a second, arranged in the same manner and consecrated to the goddess of mercy; sometimes the cloisters have an upper [illegible] libraries. The enclosure contains besides, buildings for lod- [illegible] ans (1933; 234).

[illegible] aret (page 213), and their plans differ from that just analysed only by the arrangement of a "mirzab" in the sanctuary, divided in five aisles by rows of columns.

Note that, secular or sacred, a Chinese edifice is lighted only through the doorway and by openings made at right and l left of it, at the back of the veranda.

IV. Commemorative Monuments.

The Chinese form of a memorial monument is a triumphal gate (pai lou) with three or five openings, the middle one wider than the lateral ones. This is commonly a portico in carpentry or stone, according to the formula of the Hindoo "torah" (page 300), sheltered or not by a roof; but it may also be a [illegible] to the Roman triumphal arch; for example, such is that at Pekin, which announces the Temple of Confucius (1936, 3).

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As for the mosques, they do not include the ceremonial minaret (page 218), and their plans differ from that just analyzed only by the arrangement of a "mirhab" in the sanctuary, divided in five aisles by rows of columns.

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1. Materials and Methods.

Guided by the positive and industrious genius of the yellow races, Chinese architecture knew how to adapt itself to the [illegible] peculiarity of a very rainy climate, very warm in summer, stormy, with a vegetation rich in woods, and in large [illegible] first of these conditions a development of the roof, that forms one of the most distinctive traits of this school; from the second, a method of building the temple as well as the palace and the house, of carpentry on a substructure of bricks or stone; finally, from the combination of both, a very original shape of the roof.

[illegible] network, whose intervals are closed by compartments in wood, of tamped earth, or of bricks (238; 228; 232; 234; 242). This building bears the name of ting in China; it comprises a [illegible] example, as attested by the Imperial Palace at [illegible] which astonished Marco Polo (page 356, Note 2).

[illegible] in utilizing the bamboo. Its connections are made by inserting a tenon in a mortise and by the insertion of a beam into the top of a forked post ([illegible], 1); when it employs bamboos, these two methods are very ingeniously combined with that of cords held by pins ([illegible], 2,3).

It was not acquainted with the truss with tie-beam and did not stiffen the frame of a panel by the artifice of a triangle [illegible] warping by careful erection, by substituting for the single member a connected pair (237, 4,6), ensuring the permanence of angles by the insertion of wedges or the adjustment of brackets (235, 3; 237, 3; 242). The isolated supports rest on a square block of stone.

Yet the Chinese have always understood construction with a [illegible] bricks of very good quality, and cut regular blocks of limes- [illegible]

Chapter 3. Construction.

I. Materials and Methods.

Guided by the positive and industrious genius of the yellow races, Chinese architecture knew how to adapt itself to the twofold peculiarity of a very rainy climate, very warm in summer, stormy, with a vegetation rich in woods, and in large l light and stiff reeds in the south. There results from the first of these conditions a development of the roof, that forms one of the most dishinctive traits of this school; from the second, a method of building the temple as well as the p palace and the house, of carpentry on a substructure of bricks or stone; finally, from the combination of both, a very original shape of the roof.

A Chinese structure consists of a roof, supported by a framework, whose intervals are closed by compartments in wood, of tamped earth, or of bricks (226; 228; 232; 234; 242). This building bears the name of ting in China; it comprises a construction entirely of bamboo, even at a great scale,-- for example, as attested by the Imperial Palace at Tchang-tou, w which astonished Marco Polo (page 336, Note 2).

Indeed, Chinese carpentry made proof of much skill, notably in utilizing the bamboo. Its connections are made by inserting a tenon in a mortise and by the insertion of a beam into the top of a forked post (235, 1); when it employs bamboos, these two methods are very ingeniously combined with that of cords held by pins (235, 2,3).

It was not acquainted with the truss with tie-beam, and did not stiffen the frame of a panel by the artifice of a triangle; it protected itself against the risks of overthrow and w warping by careful erection, by substituting for the single member a connected pair (237, 4,6), ensuring the permanence of angles by the insertion of wedges or the adjustment of brackets (235, 3; 237, 3; 242). The isolated supports rest on a square block of stone.

Yet the Chinese have always understood construction with h hard materials. In very ancient times, they employed burned bricks of very good quality, and cut regular blocks of limestone, sandstone, or even granite (229; 230; 232; 239; 244). Also early, they used regular masonry, and incited by their

[illegible]

[illegible] vault, either semicircular or pointed, with openings of [illegible] ft. or more (224; [illegible]). [1]

Note 1. For example, see the Gates of Pekin and that of K Kin Yong Kouan in the Great Wall (224).

II. Covering.

The Chinese roof is of the type with two gutters; it amply projects from the faces of the walls so as to shelter them. [illegible] season, each gable facade is provided with a hip roof, which unites with the lower zone of the slopes (237, 1). If it is to be covered with thatch or bamboo, it is a light framework [illegible] composed of a frame, tied at the intersections; of lateral edges forming hips, and the lower edge takes the part of a p [illegible] by cords, is found in a plane above that of the hips on which it is set; hence the upper ends of the rafters are raised the [illegible] displeasing, this shape was adopted as a necessity resulting from construction, and even emphasized in carpentry after the 6 th century A.D., so that the raised angles of the roof became an essential trait of architecture among the yellow races. Indeed, this rendered the service of reducing the obstacle to the entrance of light into interiors, presented by the exten- [illegible] ers were raised, the Chinese roof presents concave outlines. ([illegible]; 237, 1; 241; 242).

The heavy load of a covering of tiles set on a layer of mor- [illegible] roofs strong and stable. They multiplied the points of support. Besides those furnished by the rectangular perimeter a [illegible] arranged intermediate ones, either by placing internal s [illegible]

practical sense, they built hollow walls, whose faces were c connected by transverse partitions. Finally, before the 14 th century, they knew how to construct correctly a radial tunnel vault, either semicircular or pointed, with openings of 23 ft. or more (224; 2365 238). [1]

Note 1. For example, see the Gates of Pekin and that of K Kin Yong Kouan in the Great Wall (224).

II. Covering.

The Chinese roof is of the type with two gutters; it amply projects from the faces of the walls so as to shelter them from the rain and sun (226; 230; 232; 234; 242); for the same reason, each gable facade is provided with a hip roof, which unites with the lower zone of the slopes (237, 1). If it is to be covered with thatch or bamboo, it is a light framework of canes. In this case, each slope is a trapezoidal panel c composed of a frame, tied at the intersections; of lateral edges forming hips, and the lower edge takes the part of a p plate (237, 2). The last, because of the method of connecting by cords, is found in a plane above that of the hips on which it is set; hence the upper ends of the rafters are raised the more, the shorter they are, so that the series of their extremities forms a symmetrical arc curving upwards. Far from d displeasing, this shape was adopted as a necessity resulting from construction, and even emphasized in carpentry after the 6 th century A.D., so that the raised angles of the roof became an essential trait of architecture among the yellow races. Indeed, this rendered the service of reducing the obstacle to the entrance of light into interiors, presented by the extensive projection of the roof. Since on the other hand, to lessen that inconvenience, the overhanging portions of the rafters were raised, the Chinese roof presents concave outlines. (234; 237, 1; 241; 242).

The heavy load of a covering of tiles set on a layer of mortar, and the heavy pressures of very violent winds constrained Chinese constructors to spare nothing, that might make their roofs strong and stable. They multiplied the points of support. Besides those furnished by the rectangular perimeter a and the projection of a series of brackets (234; 242), they arranged intermediate ones, either by placing internal suppo-

supports concentric with the former and higher than it, or by setting on transverse beams posts to support the roof, or if the hall were vast, a second series of beams bearing a second row of posts, repeating this if necessary (237, 2,4,6).[1] In brief, the section of these roof [illegible] is also freely apparent; so much the more, since in China an arrangement of roofs in stories is a sign of dignity, regulated [illegible] intercolumniations, presents the appearance of upper stories, and the entirety of the building either that of a series of enclosures fitted into each other, or of the superposition of volumes capable of telescoping into each other (232; 234; 239; 241; 242).

Note 1. See an application of the same principle in Phrygian [illegible]

As for the roofing proper, in modest construction it is a [illegible] are covered by pieces of pottery (234; 237; 242).

supports concentric with the former and higher than it, or by setting on transverse beams posts to support the roof, or if the hall were vast, a second series of beams bearing a second row of posts, repeating this if necessary (237, 3,4,6). [1] In brief, the section of these roof outlines a stairway, which is also freely apparent; so much the more, since in China an arrangement of roofs in stories is a sign of dignity, regulated by law. In this case the zone formed by the visible part of the internal supports and of the partitions closing the i intercolumniations, presents the appearance of upper stories, and the entirety of the building either that of a series of enclosures fitted into each other, or of the superposition of volumes capable of telescoping into each other (232; 234; 239; 241; 242).

Note 1. See an application of the same principle in Phrygian architecture. Volume I, page 216.

As for the roofing proper, in modest construction it is a layer of thatch or of rows of split bamboos, placed with the concave sides up and covered by others reversed; but in all careful construction, these semicylindrical bamboos are replaced by strong tiles, at the same time that ridges and hips a are covered by pieces of pottery (234; 237; 242).

Chapter 4. Effect.

Considered in regard to effect, Chinese architecture reveals a curious duality; on the one hand being moderation, a taste for order and regularity; on the other is a rage for luxury and a passion for what is varied, contrasted and fantastic.

It does not seek to strike with astonishment by an exaggeration of dimensions; for the elevation as for the plan, it loves regular arrangements, centralized conceptions and symmetrical combinations; it accepts canonical requirements and the restraints of formulas; [1] it loves carved and wavy forms.

Note 1. See the ritual of Tcheou previously mentioned, and the official treatises on architecture published by the emperor Young Tchin in the 18 th century.

I. Effects of Picturesque Order.

Meanwhile its preferences are for the picturesque.

The general shape imposed on its productions is accented and emphasized by their elevation on a base, frequently profiled in steps and enclosed by parapets; by their being flanked by porticos and verandas; by the development of the height of the roof, by its strong projection from the walls, by the raising of its edges, and the upward curves at its angles (225; 228; 232; 234; 2365 239; 241; 242).

Indicative is likewise the formula of the Chinese garden, with which western Europe was infatuated in the decline of the 18 th century. (Volume III). It exhibits equally the most earnest naturalism and the most artful industry. It constitutes a world in miniature, a collection of true diminutives of objects, forms and products, of which nature offers the models; the ground being as hilly as possible, covered by rocks, running streams, cascades, varied and trained vegetation; the whole composing an irregular mosaic of distinct movement, isolated sites and restricted views. Yet a refined and subtle calculation is ingenious in arousing and impressing by contrasts; by optical illusions; by the effect of an aspect of nature, unforeseen or exciting a state of the soul, particularly with a melancholy tone; and also by the view of slight and frequent structures; bridges, piers, kiosks, hamlets, etc. (240).

II. Effects of Secondary Relief.

[illegible] -- [illegible]

Chinese architecture utilizes effects of secondary relief. It does not fail to border a wall by base and cornice, the latter being often very heavy, or to enhance the surface by [illegible]. And philosophy; it accents the curve of an arch by the aid of a single or labelled archivolt ([illegible]; 320; 328). It correspondingly models the roof by making cover tiles, ridge [illegible] a ridge resting and by tail finials; by treating its angles in motives in pottery; by supporting its projections by consoles in form of brackets, simple or superposed by corbelling. ([illegible]; 320). It again lessens effect from the relief of the [illegible] of a connection in carpentry, even as projecting angles of beams, heads of logs and angles of lasenings. It fastens and corbelses the woodwork, etc. ([illegible]; 324; 326).

On the contrary, it fill not [illegible] the effect the form of [illegible]. By reason of the connections across imposed on it, its height is strange; its section sometimes is a square with the angles chamfered, but is generally circular; it is almost always smooth; but examples of a form with [illegible] and deep [illegible] are not wanting ([illegible]). Its base is a plow with [illegible] not exceeding its diameter. Ordinarily it has no capital, or merely a [illegible] square abacus; on the other [illegible] [illegible] [illegible]

356 II. Effects of Secondary Relief.

Chinese architecture utilizes effects of secondary reliefs. It does not fail to border a wall by base and cornice, the l latter being often very heavy, or to enhance the surface by mouldings.and pilasters; it accents the curve of an arch by the aid of a simple or detailed archivolt (224; 230; 239). It energetically models the roof by using cover tiles, hip c covers and strongly projecting ridges; by crowning them with a ridge cresting and by tall finials; by treating its angles with motives in pottery; by supporting its projections by consoles in form of brackets, simple or superposed by corbelling. (234; 242). It again desires effect from the relief of the elements of a connection in carpentry, such as projecting ends of tenons, heads op inps and angles of fastenings. It festoons and perforates the woodwork, etc. (225; 234; 235).

On the contrary, it did not conceive for effect the form of the isolated support, which is nothing more than that of a p post. By reason of the considerable stress imposed on it, i its height is stumpy; its section sometimes is a square with the angles chamfered, but is generally circular; it is almost always smooth; but examples of a form with abundant and deep sculptures are not wanting (234). Its base is a block with height not exceeding its diameter. Ordinarily it has no capital, or rarely a simple square abacus; on the other hand, it frequently supports a long cap (234) or a group of corbelled brackets above each other and connected by notching, as picturesque as useful (235).

358 III. Effects of Ornamentation.

Chinese architecture passionately loves the effects of ornamentation.

And first that of selected materials; it seeks cedar and m marble, covers masonry with stucco and wood with lacker; it even came to construct entirely in bronze. [1]

Note 1. Witness the Temple of Wan cheou chan near Pekin, which is 19.7 ft. high.

It particularly likes the gleam of varnish, and the splendor of enamel; it freely practises overlaying with gold and incrusting with mother-of-pearl. It is especially lavish with facings of faience externally as well as internally, on a roof as on a wall, even on the entire roof of a monument; attested

by the "Porcelain Tower" at Nankin and the "Faience Pagoda" at Pekin.

The effect of a Chinese edifice is largely colored, so much the more that it is made brighter by its incorporation with lackered or glazed materials. Woods and stuccos are tinted, especially with vermilion or oxblood reds and greens; the last tone is likewise given by ceramics, which also appears yellow and particularly blue. Further, certain tints possessing a symbolic value, Chinese polychromy impresses the mind at t the same time as the eyes. [2]

Note 2. Thus yellow indicates an imperial monument; again a scale of dark blue, turquoise blue, oxblood red, green and dark yellow, calls up for the faithful the five joys of the Buddhist paradise, in a Temple of Heaven, everything is blue, from the tiles of the roof, which are a tint of cobalt, even to the curtains of glass beadwork, which close the openings; a Temple of the Earth is devoted to yellow, one of the Sun to red, one of the Moon to bluish-gray etc.

Sculptured ornamentation is lavished on stone and still more on wood, which commonly has its entire surface accented by reliefs and sinkgins. Frequently the panels filling facades and those of partitions are perforated (224; 225; 234; 239; 243; 244). The pottery ends of lines of tiles and the hips and ridge of the roof are richly modeled.(234; 239; 242).

Chinese decoration realized ornaments and representations. These were at first geometrical motives, notably angular frets and images of animals. Later, the fashion was for very conventional imitations of plants, such as rosettes or the lotus; for arabesques of leaves in the Persian taste, for figures of men and animals in quite restricted use; and particularly for images of fanciful beasts -- dragons, unicorns, phoenixes, b birds with human heads, generally animated with a grimacing expression, the idea of which was doubtless imported from the Mesopotamian West, Achemenide Persia and Sassanian Persia. (224; 234; 243; 244).

Part II. [illegible] in [illegible] Asia, Th-

[illegible]

[illegible] in the centre of the continent, Nepal, Thibet and [illegible]

on the one hand between India, Mesopotamia-Persia, the Hellenistic countries of the Indus and of Turkestan, on the other being China and Indo-China.

[illegible] the Nepalese and Thibetan styles of architecture a [illegible] some marked and original traits, which are [illegible]

[illegible] at a great [illegible], in an inclusure of high mountains, [illegible] and historical conditions of their development.

Chapter 1. Architecture of Nepal.

Requirements. -- Monumental Chronology and Topography.

[illegible]

[illegible] by several in the barrier of the Himalayas ensured them from [illegible] the advantages of an important passage between India on the [illegible], Thibet and China on the other. Yet within [illegible] [illegible] of the upper basin of the Bhimati, with an area of about [illegible] square miles, was always confined the political and religious life of Nepal.

The population is Tibetan; but it received from India its [illegible]

[illegible]

Tradition says that Asoka (3rd century B.C.) visited Nepal, and it attributes to that [illegible] of Buddhism the erection of the most ancient monuments of the country. It is certain, that in the 6th, and especially in the 7th centuries under the dynasty of Lichchavis, Nepal was prosperous and covered by sacred edifices; by the testimony of the Chinese pilgrim [illegible], who traversed it in the second quarter of the 7th century, "monuments and temples adjoined each other". After having suffered ten centuries from the conquests of c[illegible] and religious rivalries, Nepal recovered in the second

361 Part II. Architecture in upper Asia, Indo-China, Indonesia and Japan.

Section I. Architecture in upper Asia.

Situated in the centre of the continent, Nepal, Thibet and eastern Turkestan play the parts of artistic intermediaries: on the one hand between India, Mesopotamia-Persia, the Hellenizing countries of the Indus and of Turkestan, on the other being China and Indo-China.

Besides the Nepalese and Thibetan styles of architecture a are recommended by some marked and original traits, which are 362 both explained by the relative isolation of their areas, situated at a great height, in an inclusure of high mountains, and the physical, ethnic and historical conditions of their development.

Chapter 1. Architecture of Nepal.

Requirements. -- Monumental Chronology and Topography.

The elevated Himalayan valleys forming the state of Nepal are very fertile, and although difficult, the passes opened by several in the barrier of the Himalayas ensured them formerly the advantages of an important passage between India on the one hand, Thibet and China on the other. Yet within a 1 little canton of the upper basin of the Bagmati, with an area of about 232 square miles, was always confined the political and religious life of Nepal.

The population is Thibetan; but it received from India its religion,[1] its civilization and its rulers.

Note 1. Nepal was at first Buddhist, then Buddhist and Brahman. The two religions have not only harmonized, but have intermingled.

363 Tradition says that Asoka (3 rd century B.C.) visited Nepal, and it attributes to that ardent apostle of Buddhism the erection of the most ancient monuments of the country. It is certain, that in the 6 th, and especially in the 7 th centuries under the dynasty of Licchavis, Nepal was prosperous and covered by sacred edifices; by the testimony of the Chinese pilgrim Hiuen-tsang, who traversed it in the second quarter of the 7 th century, "monuments and temples adjoined each other."

After having suffered for centuries from the contests of c clans and religious rivalries, Nepal recovered in the second

half of the 13 th century under the government of prince Mal-
[illegible]
[illegible]
from these an important architectural demand, sacred and sec-
ular, which [illegible]

Most of the existing monuments are not earlier than the 17 th century. Indeed their materials require frequent restorations.

Patan, the capital after 880, is encumbered by monuments -- [illegible] Temples of Mandouddha (16 th century), of Mahadeva and of Sudna Krishna; the entirety of the palaces and sanctuaries grouped around the square of its Royal Palace (darbar) forms one of the monumental views, most picturesque and most impressive in the world. Katmandou was founded about 724, and divided [illegible] teries and ninety-eight secondary ones; its Temple of Taleju (middle of the 16 th century) is one of the principal in Nepal. Bhatgaon was built about 805 and is entirely Brahmanic, having no less than fifteen monasteries of the first class and a hundred of lesser importance; its Royal Palace and the Temples of Changa Narayan and of Nyatpola Deval (1708) are also typical as well as singular. Pasupati -- north of the Bagmati and about 3.1 miles from Katmandou -- one of the holy places of Siva-Brahmanism, is an astonishing group of monasteries and temples, opposite which are the Buddhist monuments of Buddhath, celebrated even to the northern borders of upper Asia, at about 3.1 miles from Katmandou, and those of Syambunath in the vicinity of the same city.

[illegible]

The development of Nepalese architecture was conditioned by the forest wealth of the country, by the Tibetan temperament [illegible] of the civilization of Gangetic India.

[illegible] a composite style, very picturesque and original in large measure.

half of the 14 th century under the government of prince Malla Jaya Stithti, who conciliated Brahmanism and Buddhism and entered into relations with Tibet and China. There resulted from these an important architectural demand, sacred and secular, which continued in the course of the succeeding centuries.

Most of the existing monuments are not earlier than the 17 th century. Indeed their materials require frequent restorations.

Patan, the capital after 630, is encumbered by monuments -- particularly Buddhist -- among which are distinguished the T Temples of Mahabuddha (16 th century), of Mahadeva and of Radha Krisna; the entirety of the palaces and sanctuaries grouped around the square of its Royal Palace (darbar) forms one of the monumental views, most picturesque and most impressive in the world. Katmandou was founded about 724, and divided between Buddhism and Brahmanism, possesses eight great monasteries and ninety-eight secondary ones; its Temple of Taleju (middle of the 16 th century) is one of the principal in Nepal. Bhatgaon was built about 865 and is entirely Brahmanic, having no less than fifteen monasteries of the first class and a hundred of lesser importance; its Royal Palace and the Temples of Changu Narayan and of Nyatpola Deval (1708) are also typical as well as singular. Pasupati-- north of the Bagmati and about 3.1 miles from Katmandou -- one of the holy places of Siva-Brahmanism, is an astonishing group of monasteries and temples, opposite which are the Buddhist monuments of Buddnath, celebrated even to the northern borders of upper Asia, at about 3.1 miles from Katmandou, and those of Syambunath in the vicinity of the same city.

Altogether, in the limited area previously defined, are counted more than two thousand religious edifices.

II. Conditions. -- Influences. -- Radiation.

The development of Nepalese architecture was conditioned by the forest wealth of the country, by the Tibetan temperament of the population, and finally by an energetic intervention of the civilization of Gangetic India.

From the combination of there various influences resulted a composite style, very picturesque and original in large measure.

its radiation was considered [illegible]

[illegible]

[illegible] 240), and perhaps even India (page 240; Fig. 216, 18).

III. Programmes and their Realization.

Religious Programmes.

[illegible] ed from its Indian model by additions and modifications.

The primitive formula, an application of which is offered by the Monument of Sudhath, retained the hemispherical tumulus, faced with bricks and placed on a projecting terrace in one or more stories; but it added four chapels inserted in the mass, facing toward the cardinal points, and destined to shelter as many figures of Buddha; besides, it composed the crown of a sort of cubical mass supporting a slender pyramid in three steps -- the image of a series of successive umbrellas of honor (page 303)(247, 1).

The hemispheres [illegible] by a cubical block with cornice and gables, from which rose a mast supporting 12 wooden disks, regularly spaced and with diameters decreasing from bottom to top. On the last one was erected a light structure of pieces of wood and metal in form of a spindle, and terminating in a turret.[1] (247, 2). Further, the substructure became either a low portico forming a plinth, or a cubical pedestal with a niche on each side, or even a sort of open pavilion in stories.

Note 1. The analogy of the two varieties of the crown just [illegible]

[illegible] tical series of enclosures on a square plan, and generally a [illegible]

Sometimes -- witness the exquisite Temple of Krishna at Pat- [illegible] porticos, the uppermost bearing a slender dome in form of a cone with curved outline, like the Indian sikhara (page 321), and others have pavilions with colonnades.[2] More frequently a structure in bricks and in wood forms a pagoda, each story of which was provided with a roof. On the ground story a por- [illegible] image.

Its radiation was considerable, favored by the immense reputation of some of its sanctuaries and by ethnic affinities; it influenced Tibet (page 368), Burmah (page 408), China (page 340), and perhaps even India (page 320; Fig. 215, 16).

III. Programmes and their Realization.

Religious Programmes.

The Nepalese programme of the Buddhist stupa is distinguished from its Indian model by additions and modifications.

The primitive formula, an application of which is offered by the Monument of Buddnath, retained the hemispherical tumulus, faced with bricks and placed on a projecting terrace in one or more stories; but it added four chapels inserted in t the mass, facing toward the cardinal points, and destined to shelter as many figures of Buddha; besides, it composed the crown of a sort of cubical mass supporting a slender pyramid in three steps -- the image of a series of successive umbrellas of honor (page 303)(247, 1).

365 The hemisphere later received the form of a bell, crowned by a cubical block with cornice and gables, from which rose a mast supporting 13 wooden disks, regularly spaced and with diameters decreasing from bottom to top. On the last one was erected a light structure of pieces of wood and metal in form of a spindle, and terminating in a turret. [1] (247, 2). Further, the substructure became either a low portico forming a plinth, or a cubical pedestal with a niche on each side, or even a sort of open pavilion in stories.

Note 1. The analogy of the two varieties of the crown just defined, with the relief of the Chinese pagoda is striking.

366 The properly Nepalese type of sanctuary consisted of a vertical series of enclosures on a square plan, and generally s smaller upwards.

Sometimes -- witness the exquisite Temple of Krisna at Patan -- a construction in stone was on superposed terraces or porticos, the uppermost bearing a slender dome in form of a cone with curved outline, like the Indian sikhara (page 321), and others have pavilions with colonnades. [2] More frequently a structure in bricks and in wood forms a pagoda, each story of which was provided with a roof. On the ground story a portico enclosed a hall, that served as a shrine for a sacred i image.

[illegible]

In both cases, it was a rule that the edifice should be el- [illegible] with a staircase on the front side (248).

Note 3. Note the theme presented by the Nepalese pagoda as the imitation of an Indian prototype, contemporaneous with the time, when India only practised construction in wood. (see Sylvain Levi's Le Nepal). It rather appears to us as an example of Himalayan construction, conditioned by the abundance of excellent wood. See the wooden edifices found in the valleys of Himalaya between the Sutledge and the Ganges (249).

[illegible] (page 309) in the form of pillars of rectangular section, crowned [illegible] interior of which was suspended a bell, credited by native credulity with the power of driving away demons.

Note that certain temples were limited -- like the pettas [illegible] erected a statue and chapels.

As for the monastery, it was a rectangular court with its centre occupied by a religious monument, and the sides by cells.

The Nepalese house is arranged around a court, the internal facades are characterized by the projection of verandas and galleries; the external, by very pronounced corbelling of the story and by the projection of trellised loggias.

IV. Construction.

The favorite material of the Nepalese construction was of timber, offered in abundance and of excellent quality by the country, they likewise [illegible]

[illegible] tecture figures a method of marking the upper part of the fac-

Note 2. Note the resemblance of this Nepalese type to that illustrated in Buddhist India by the vihara in stories (201,1), and in Mohommedan India by the Tomb of Akbar at Sikandara, a and by various elements of the Palace of Fathpur-Sikri (page 126).

In both cases, it was a rule that the edifice should be elevated on a terrace, sometimes very high, profiled in steps with a stairway on the front side (248).[3]

Note 3. Note the theme presented by the Nepalese pagoda as the imitation of an Indian prototype, contemporaneous with the time, when India only practised construction in wood.(see Sylvain Levi's Le Nepal). It rather appears to us as an example of Himalayan construction, conditioned by the abundance of excellent wood. See the wooden edifices found in the valleys of Himalaya between the Sutledge and the Ganges (249). Also compare the Nepalese pagoda and those of China.

Like Indian architecture, the Nepalese erected lats (page 302) in the form of pillars of rectangular section, crowned by an expanded lotus, itself surmounted by a sacred figure.

A sort of campanile was formed by a stone portico, in the interior of which was suspended a bell, credited by native credulity with the power of driving away demons.

Note that certain temples were limited -- like the bettas of India (page 308)-- to a sacred enclosure in which were erected a statue and chapels.

As for the monastery, it was a rectangular court with its centre occupied by a religious monument, and the sides by cells.

The Nepalese house is arranged around a court, the internal facades are characterized by the projection of verandas and galleries; the external, by very pronounced corbelling of the story and by the projection of trellised loggias.

367 IV. Construction.

The favorite material of the Nepalese construction was of timber, offered in abundance and of excellent quality by the country, they likewise freely employed bricks. Still, they understood stone construction.

In the first rank of the characteristics of Nepalese architecture figures a method of marking the upper part of the fac-

[illegible]

[illegible] by strongly projecting roofs, supported by numerous b[illegible] brackets and ending at each angle in a recurved crocket (ad[illegible]). When the edifice has several stories, each one has such a roof, so that the entire appearance is that of a pyramidal hood. [illegible] on the supports of the roof are closed by panels.

Protection from rain was ensured by a covering of tiles or of metal.

[illegible]

Nepalese monuments are counted among the number of the most picturesque, that exist.

Their elevation on a terrace or a stepped pedestal; the singular forms of their roofs, the varied play of light and shadow produced by the openings of their portices and the projections of their roofs, their pointed pinnacles and their angle crockets compose an appearance of relief with movement and [illegible] ly barbaric, but singularly energetic and tasteful.

It is also further completed by the appearance of its ornamentation. Rich to excess, it is both in relief and polychromatic. It comprises covering sculptures, marvellously wrought, detailed and incised -- whether the material was stone or wood -- as if they belonged to goldsmith's work; paintings with a splendid coloring and boldly contrasted; finally, details in bronze and overlays in metal.

[illegible]

facade by strongly projecting roofs, supported by numerous b brackets and ending at each angle in a recurved crocket (248). When the edifice has several stories, each one has such a roof, so that the entire appearance is that of a pyramidal hood. The analogy is still more striking, when the intervals between the supports of the roof are closed by panels.

Protection from rain was ensured by a covering of tiles or of metal.

V. Effect.

Nepalese monuments are counted among the number of the most picturesque, that exist.

Their elevation on a terrace or a stepped pedestal; the singular forms of their roofs, the varied play of light and shadow produced by the openings of their porticos and the projections of their roofs, their pointed pinnacles and their angle crockets compose an appearance of relief with movement and c contrast, frequently with a foreign effect, sometimes slightly barbaric, but singularly energetic and tasteful.

It is also further completed by the appearance of its ornamentation. Rich to excess, it is both in relief and polychromatic. It comprises covering sculptures, marvellously wrought, detailed and incised -- whether the material was stone or wood -- as if they belonged to goldsmith's work; paintings with s splendid coloring and boldly contrasted; finally, details in bronze and overlays in metal.

The repertory comprises foliage arabesques, fanciful ornaments and figures of monsters.

the 7 th century A.D. under the government of the king of [illegible] to anonymousness. Indeed, this warlike sovereign, the author of fortunate expeditions against Kapal and Gilna, having married a Nepalese and a Chinese princess, these being fervent Buddhists constructed the erection of a monastery in the centre of Lhasa (Gyā), named Lamrang, for the shelter of the holy images brought by them.

A century later, the success of an Indian missionary, Padma Sambhava, founder of Lamaism of Tibet (Bhutan), [illegible] ism of a great monastery at Sam-yas, southeast of Lhasa, monumental [illegible] in [illegible] at [illegible], [illegible] [illegible] [illegible]

Chapter 2. Tibetan Architecture.

I. Requirements. -- Monumental Chronology and Topography.

Tibetan civilization was roughed out about the middle of t the 7 th century A.D. under the government of the king of Lhasa, Sron-tsang-gam-po (629-650), and it immediately appealed to architecture. Indeed, this warlike sovereign, the author of fortunate expeditions against Nepal and China, having married a Nepalese and a Chinese princess, these being fervent Buddhists obtained the erection of a monastery in the centre of Lhasa (643), named Lhabrang, for the shelter of the holy images brought by them.

A century later, the success of an Indian missionary, Padma Sambhava, founder of the sect of Red Hats, decided the erection of a great monastery at Sam-yas, southeast of Lhasa, whose enclosure extends to a length of more than 1.56 miles.

About the middle of the 11 th century, Buddhism assumed a new advance as the result of the establishment of another Indian monk, Atica, creator of the sect of Gelugpa or Yellow H Hats, in the western part of the elevated valley of the Brahmapoutra. In the decline of the century (1071) was built the celebrated Monastery of Sakya, west-southwest of Chigatse, w whose abbot became in 1270 the pope of Lamaism and tributary prince of Tibet, by the favor of the Mongol emperor Koubilai Khan. This clerical and lay organization and the generosity of the pious Koubilai Khan were the causes of an enormous multiplication of Tibetan monasteries.

At the beginning of the 15 th century, architecture benefited by the reform of the sect Gelugpa accomplished by the lama Tsong-kha-pa (1355-1417). From that time date the great convents of Gandam (1409), of Depung (1414) and of Sera (1417) all three being in the region of Lhasa. In 1445 was built that of Ta-chi-lum-po near Chigatse, which became the residence of Ta-chi-lama, the pope of the Yellow Hats. We further cite the important monasteries of Gyantse, southeast of Chigatse, of Ta-chi-yem-be and of Tarting, northwest of the same city; the Potala of Lhasa, the Palace of the Dalai-lama (1642); the Monastery of Lhabrong, the third in importance of all those of Tibet, erected in the extreme northeast of the country and on the frontier of Chinese Kansou. Recall finally, that

[illegible]

[illegible]

[illegible]

[illegible]

racy, compelled to fortify its residences.

[illegible]

Favored by the number of demands addressed to it, by the i importance of many programmes to be realized, and finally by the wealth of the Lamaist clergy, Tibetan architecture, in l large measure, was conditioned by the forest wealth of the [illegible]

originality of the temperament of its inhabitants.

Thus in spite of important artistic infiltrations, resulting from the religious propaganda of India, and in modern times from the political predominance of China, this art has i its own very marked appearance, with traits impressive as well [illegible].

Note that the expansion of Lamaism introduced it into Mongolia and northern China -- as proved respectively by the monuments of Ourga and of Jehol -- and that it [illegible]

[illegible]

In Tibet, religious architecture was required to create commemorative monuments or reliquaries and monasteries. The forbear the name of chorten and were derived from the Indian [illegible]

The latter, the principal ones forming actual cities, comprise a temple, a sacred library, assembly halls, a house for [illegible]

Note 2. They have five or six thousand monks.

[illegible]

and two side aisles by colonnades supporting the covering; a [illegible]

altar is at the rear end and opposite the entrance. No windows; but frequently is an opening in the ceiling over the holy of holies. The programme further comprises chapels conse-

[illegible]

Tibet is covered by monasteries, even in its desert regions.

Although very inferior, the secular demands of the Tibetans was real, determined by the needs of a population relatively carefwl to have themselves well, and ofa quarrelsome aristocracy, compelled to fortify its residences.

II. Conditions. -- Influences. -- Radiation.

Favored by the number of demands addressed to it, by the i importance of many programmes to be realized, and finally by the wealth of the Lamaist clergy, Tibetan architecture, in l large measure, was conditioned by the forest wealth of the country, by the rudeness of a variable climate, and by the o originality of the temperament of its inhabitants.

Thus in spite of important artistic inflitrations, resulting from the religious propaganda of India, and in modern times from the political predominance of China, this art has i its own very marked appearance, with traits impressive as well as characteristic.

Note that the expansion of Lamaism introduced it into Mongolia and northern China -- as proved respectively by the monuments of Ourga and of Jehol -- and that it radiated over Nepal and the northwest of Indo-China.

III. Programmes and their Realizations.

Religious Programmes.

In Tibet, religious architecture was required to create commemorative monuments or reliquaries and monasteries. The forbear the name of chorten and were derived from the Indian stupa (page 303).

The latter, the principal ones forming actual cities, [2] comprise a temple, a sacred library, assembly halls, a house for the abbot, and around this central group are the habitations of the lamas, distributed in quarters.

Note 2. They have five or sik thousand monks.

The temple is a rectangular nave, divided into one central and two side aisles by colonnades supporting the covering; s sometimes galleries reduce the side aisles to low aisles; the altar is at the rear end and opposite the entrance. No windows; but frequently is an opening in the ceiling over the holy of holies. The programme further comprises chapels consecrated to inferior divinities, sacristies, treasuries, and on

the dignity of the edifice.

[illegible] and the replacing of the covered nave by a court enclosing it is both a temple and a religious (243).

Secular programme.

The programme of the Tibetan house is distinguished by a [illegible] hall with a hearth, which serves as a kitchen; living rooms; a stable; and a storehouse; the chambers are frequently in a second story. When developed, the residence contains further [illegible] rooms, well served by stairways and corridors, and a chapel. Openings are rare and small in the facade. In [illegible], the [illegible] [illegible].

The Tibetan castle (dzong) is an imposing and strong group of high and [illegible] towers on a square plan, which are sometimes [illegible] lum-po have a truly [illegible] appearance (251).

The [illegible] of the [illegible] are [illegible] various in Chinese style.

IV. Fortifications.

[illegible] construction consists in piling up stones dry, walls crevices are filled with earth, or of a mass of tamped earth, strengthened by wooden ties. The use of stucco coating is [illegible].

Walls are strongly [illegible], and openings are trapezoidal (244); for a covering, a ceiling is supported by a series of columns. As for the roof, it is terraced and is sometimes covered by tiles.

V. Altars.

[illegible] [illegible] [illegible] [

the terraced roof is a pavilion in Chinese style, indicating the dignity of the edifice.

The Great Temple of Lhasa, that of the Lhabrong, presents a special arrangement, whose peculiarities -- the doubled sanctuary and the replacing of the covered nave by a court enclosed by porticos and corridors -- is explained by the fact, that it is both a temple and a reliquary (252).

Secular Programmes.

The programme of the Tibetan house is distinguished by a c
372 common hall with a hearth, whose smoke escapes by a lantern; living rooms; a stable and a storehouse; the chambers are frequently in a second story. When developed, the residence compriser numerous rooms, well served by stairways and corridors, and a chapel. Openings are rare and small in the facade. In wooden regions, the rural dwellings recall Swiss chalets.

The Tibetan castle (dzong) is an imposing and strong group of high and great towers on a square plan, which are sometimes dominated by a keep (253). Those of Lhasa and of Ta-chi-lum-po have a truly bold appearance (251).

The tombs of the grand lamas are high towers covered by pavilions in Chinese style.

IV. Construction.

When careful, Tibetan construction is in stone masonry; ordinary construction consists in piling up stones dry, whose crevices are filled with earth, or of a mass of tamped earth, strengthened by wooden ties. The use of stucco coating is the rule.

Walls are strongly battering, and openings are trapezoidal (254); for a covering, a ceiling is supported by a series of columns. As for the roof, it is terraced and is sometimes covered by tiles.

V. Effect.

Tibetan monuments betray a passion for effects of picturesque order.

They always derive an advantage from their location, either on a height dominating a vast extent of country, or in surroundings of a smiling and grand nature.

373 Besides, they have from their authors the power of impressing the eye and the mind by violent contrasts of color, by

accents in relief, and by the play of light and shade; at the top of the external surfaces of the walls of the sacred edifices, at an elevation of several yards, breaks forth the violence of a zone of dark vermilion, sometimes enhanced by the yellow and black spots of the decoration of the ends of the carpentry of the roof (254); from the roofs of the monuments rises the brilliant caprice of a slender story, perforated, accented by cresting, pinnacles, upturned angles, and emphasized by gilding; particularly, the interiors of the temples, because of the obscurity of the nave, of the dim polychromy of mural frescos and hangings of embroidered silks, of the g gleams of gold lit by numerous lamps, of the strong illumination of the altar by the opening arranged in the ceiling, compose a wonderful and effective view, "a vision of another world". [1]

Note 1. Sven Hedin. Le Tibet dévoilé.

I. Requirements. -- Monumental Chronology and Topography.

At the end of the ancient era and in the first centuries A.D., eastern Turkestan was far more populous than today. More damp, better irrigated, and by reason of the predominance of China, favored by relative security, the country east of the Pamir, south of the Thian-Shan mountains and north of the Karakorum and Altyn-Dagh mountains, contained great centres of civilization, and derived benefit from an active and regular [illegible] western Asia on the other.

The regions of Kashgar, Yarkand and of Khotan are covered by ruins invaded by sand.[2]

Note 2. See the ruins of Yotkan, east of Khotan; of Ulugalik, of Karadoi, of Rawak, of Dandan-uilik, of Mekre Maken, of Toumchouq, etc.

At the stops on the route connecting Khotan with the Chinese city of Tunhuang are located cities and posts -- notably [illegible] on the frontiers of Lou-Nor, and the key of the communications between Lhasa and the eastern basin of the Tarim. The prosperity of these different regions appears to have culminated in the 3 rd century A.D.; about the end of the 8 th, it suffered from a dependence of Chinese power and from Tibetan invasions.

There resulted an increase of travel on the northern route connecting Tun-huang to Kashgar, and which was likewise planted with important agricultural and commercial groups; for a example, such as Kara-shahr and especially Idikutschari, southeast of Turfan, whose climax corresponds to the 2 th century and its decadence to the end of the 14 th century.

The peoples of these regions, a mixture of yue-tchi, Turkish, Chinese, Bactrian and Indian elements, professed Buddhism [illegible] demands for stupas, sanctuaries, temples, monasteries and sacred grottoes.[1] [illegible] and military architecture.

[illegible] a pilgrimage from China to India and passed through Lou-Nor,

Chapter 3. Architecture of eastern Turkestan.

I. Requirements. -- monumental Chronology and Topography.

At the end of the ancient era and in the first centuries A.D., eastern Turkestan was far more populous than today. More damp, better irrigated, and by reason of the predominance of China, favored by relative security, the country east of the Pamir, south of the Thian-Chan mountains and north of the Karakorum and Altyn-Dagh mountains, contained great centres of civilization, and derived benefit from an active and regular travel between China on the one hand, India and central and western Asia on the other.

The regions of Kashgar, Yarkand and of Khotan are covered by ruins invaded by sand. [2]

Note 2. See the ruins of Yothan, east of Khotan; of Khogalik, of Kara sai, of Rawak, of Dandan-uilik, of Takla Makan, of Toumchouq, etc.

At the stops on the route connecting Khotan with the Chinese city of Tunhuang are located cities and posts -- notably at Nya, Endert and Miran, the capital of the state of Loulan, on the frontiers of Lob-Nor, and the key of the communications between Lhasa and the eastern basin of the Tarim. The prosperity of these different regions appears to have culminated in the 3 rd century A.D.; about the end of the 8 th, it suffered from a decadence of Chinest power and from Tibetan invasions.

There resulted an increase of travel on the northern route connecting Tun-huang to Kashgar, and which was likewise planted with important agricultural and commercial groups; for e example, such as Kara-shahr and especially Idikutschari, southeast of Turfan, whose climax corresponds to the 9 th century and its decadence to the end of the 14 th century.

The peoples of these regions, a mixture of yue-tchi, Turkish, Chinese, Bactrian and Indian elements, professed Buddhism with fervor; they furnished numerous monks and multiplied the demands for stupas, sanctuaries, temples, monasteries and sacred grottos. [1] At the same time, they appealed to domestic and military architecture.

Note 1. At the beginning of the 5 th century, Fo-hian made a pilgrimage from China to India and passed through Lob-Nor,

[illegible]

With regard to art, they closely depended upon northwest I [illegible] [illegible] [illegible]

and he relates that in that canton 4000 monks followed the r rule of India. At Idikutschari were recognized by dozens and dozens, sanctuaries, monasteries and grottos in the adjacent mountains.

II. Influences. -- Radiation.

With regard to art, they closely depended upon northwest I India (Gandhara), the source of their religion, and on Hellenized Turkestan (Bactria and the Yue-tchi empire), which was the pole of their economic life. Their impregnation by the esthetics termed "Greco-Buddhist" is particularly apparent in the areas south of the Gobi, even to the frontiers of China (page 378). The influence of Mesopotamia and of Sassanian Iran is attested by the application of their methods of construction (page 377), particularly in the basin of the Tarim. The influence of China was very small.

On the contrary, the latter country wasstrongly impressed by those relatives of the "Greco-Buddhist" and Mesopotamian-Persian schools (pages 338-340).

III. Programmes and their Realizations.

In the region of Gobi, the stupa had a hemispherical form like its Indian prototype; but frequently instead of being a solid tumulus, it was a rotunda sheltering a dagoba (page 303). At Idikutschari were produced monuments elevated on terraces, in the image of Bodh-Gaya (198); most frequently being a prism with smaller ones at the angles; sometimes a central edifice was surrounded by shrines, more or less numerous (256).

The same place revealed the plan of a sanctuary, which appears original, unless it be connected with a Mesopotamian-Parthian arrangement, observed in the Palace of Hatra (6, 5A). A prism of square section, sometimes solid, containing a chamber, or furnished on each face with a niche-chapel for exhibiting a figure of Buddha, is surrounded by a corridor, which defines an enclosure also rectangular, pierced by a single g gate, or by one on each side, covered by a vault. [2] Note again the erection of oblong interiors for the purpose of temples or monastery halls, sometimes provided with niches and covered by a tunnel vault.

Note 2. Note the singular anology of this arrangement with that offered by Burmese sanctuaries. Also page 411.

[illegible]

[illegible] by two [illegible].

[illegible]

wattled reeds plastered with clay, a combination of wood and tamped earth, or finally in the masonry of crude bricks strengthened by wooden ties. A stucco, made of a mortar of clay and straw, always completed the structure. In the basins of the Tarim, burned bricks were in constant use.

These [illegible] in the construction of vaults, although the ordinary covering was a ceiling of carpentry [illegible] a [illegible]. These were erected in the fashion of Mesopotamia-Persia in the Sassanian epoch, either in the form of tunnel vaults built in mixes without centering, or as domes on a square s[illegible] [illegible] (Pages 14, 15).

[illegible]

In the country of the Gobi, effect was required by coatings of stucco and the realization of relief and especially of painted ornamentation. The visible parts of the woodwork were accented by a profusion of decorations carved in very low relief or rather [illegible] (SSS); the walls were covered by frescoes.

The favorite motives of the sculptor were ornaments -- ros[illegible] from the repertory of of the "Greco-Buddhist" art of Gandara and of Turkestan (SSS). The painter frequently represented with great success figures and religious themes, as well as [illegible] personages and genre scenes.]

Note 1. See the fragments brought by the mission of Aurel Stein and exhibited in the British Museum.

As for houses, as in China they ordinarily consisted of a building flanked by two wings.

IV. Construction.

The construction employed was either exclusively of wood, wattled reeds plastered with clay, a combination of wood and tamped earth, or linally in the masonry of crude bricks strengthened by wooden ties. A stucco, made of a mortar of clay and straw, always completed the structure. In the basins of the Tarim, burned bricks were in constant use.

These served in the construction of vaults, although the ordinary covering was a ceiling of carpentry supporting a terrace. These were erected in the fashion of Mesopotamia-Persia in the Sassanian epoch, either in the form of tunnel vaults built in slices without centering, or as domes on a square s support, connecting with the angles by the artifice of trumpets. (Pages 14, 15).

378 V. Effect.

In the country of the Gobi, effect was required by coatings of stucco and the realization of relief and especially of painted ornamentation. The visible parts of the woodwork were accented by a profusion of decorations carved in very low relief or rather sunken (258); the walls were covered by frescos.

The favorite motives of the sculptor were ornaments -- rosettes, rows of lozenges or circles, scrolls etc. -- borrowed from the repertory of of the"Greco-Buddhist" art of Gandara and of Turkestan (258). The painter frequently represented with great success figures and religious themes, as well as actual personages and genre scenes. [1]

Note 1. See the fragments brought by the mission of Aurel Stein and exhibited in the British Museum.

Section II. Architecture in Indo-China and I Indonesia.

The various architectural styles of Indo-China and of Indonesia have an air of relationship. That occurs, without mentioning the communications between them, because all depend on the same physical, human and artistic conditions: an equatorial or tropical climate; mixed races; a brilliant economic prosperity; a dense population, where an autocratic rule and a dead season of three months in agriculture permits architecture to gather multitudes by levies; Brahman religion, more or less in competition with Buddhism; finally and particularly, the energetic and prolonged influence of India.

In fact, long before the beginning of the Christian ear, Indo-China and Indonesia were visited by merchants, adventurers and missionaries, who founded establishments and introduced civilization and diffused Brahmanism. From the 3 rd century B.C., the Buddhist propaganda increased the number of their Indian visitors. As a result, they remained in constant relations with the country, the cradle of their religion and their civilization.

There resulted from this an artistic fertilization to which was opposed an infiltration of Nepalese, Tibetan, Greco-Buddhist, Mesopotamian-Persian and Chinese arts. The second was accomplished, on the one hand, by the routes opened by the e elevated valleys of the Indo-Chinese rivers, and which were borrowed from the peoples of the peninsula, originally from eastern Tibet and from the southwest of China; on the other, in consequence of a Chinese immigration by land and sea, which was commenced by the conquest of Annam in the 3 rd century B.C.

We shall successively examine the group of Cham, Khmer and Javanese architectural styles, between which are observed incontestable resemblances; Burmese architecture, which has its own appearance; and finally, the Siamese and Laotian architectural styles, more recent and dependant on the others in great measure.

Chapter 1. Cham Architecture.

I. Monumental Chronology and Topography. -- Conditions.

From the beginning of the Christian era, [1] the eastern port-

[illegible] and 12 th [illegible], formed the area of the realm of Champa, [illegible] was at first [illegible] in Quang-nam, and from the [illegible] th century was [illegible] near the port of Qui-nhon. [illegible] in the 5 th and 6 th centuries, tributary to China in the 7 th and 8 th, always fighting against the [illegible] and Annam, it was [illegible] by the latter at the end of the 15 th century. In [illegible] of its grandeur, Cham-[illegible]

[illegible]

The Cham received from India their religion, which was Si-[illegible] and the principle of their civilization. They had relations with China and with Java.

Their architecture is revealed by ruins scattered from Don-[illegible] [illegible] of Cham history; of Quang-nam, Khan-rang, Lho-trang and Qui-nhon.

The period of maturity of Cham architecture began towards the decline of the 6 th century and lasted nearly three centuries; the decadence was rapid.

The Cham temples recall both the Khmer monuments of the 7 th century and those erected in Java (compare [illegible] with [illegible]) in the region of Dieng from the 10 th to the 12 th centuries. [illegible] but it is impossible to determine the direction and the [illegible].

[illegible] a monumental gateway; a [illegible] of the [illegible] -- a square cell elevated on a [illegible] in the centre of the enclosure, and accessible at the east, either directly or after traversing a narrow porch; an o[illegible] [illegible] of the shrine; finally before the e

portion of Indo-China, comprised between the Mekong, the Sea, 11 th and 17 th north latitude, formed the area of the realm of Champa, [2] whose capital was at first Ding-Duong in Quangnam, and from the 10 th century was Bink-dinh near the port of Qui-nhon. Powerful in the 5 th and 6 th centuries, tributary to China in the 7 th and 8 th, always fighting against the Khmer empire and Annam, it was crushed by the latter at the end of the 15 th century. In the time of its grandeur, Champa enjoyed a remarkable prosperity, and its wealth obtained the admiration of Marco Polo, when he visited Binh-dinh in 1280.

Note 1. The most ancient Chom inscription dates from the 2 nd century A.D.

Note 2. The Chinesnome it Lin-yi.

The Chams received from India their religion, which was Sivaic Bhahmanism and the principle of their civilization. They had relations with China and with Java.

Their architecture is revealed by ruins scattered from Donghoi nearly to Phan-thit. The most important are those of Mison, southwest of Tourane, which represent the different epochs of Cham history; of Quang-nam, Phan-rang, Nha-trang and Qui-nhon.

The period of maturity of Cham architecture began towards the decline of the 6 th century and lasted nearly three centuries; the decadence was rapid.

The Cham temples recall both the Khmer monuments of the 7 th century and those erected in Java (compare 260 with 278,1) in the region of Dieng from the 10 th to the 12 th centuries. The hypothesis of artistic communications between these countries is probable; but it is impossible to determine the direction and the mode.

II. Programmes and their Realizations.

The canonical programme of a Cham temple required a sacred area, whose rectangular enclosure was interrupted at the middle of the eastern side by a monumental gateway; a sanctuary-- shelter of the linga -- a square cell elevated on a substrucure in the centre of the enclosure, and accessible at the east, either directly or after traversing a narrow porch; an o oblong hall placed south of the shrine; finally before the e

enclosure are on the axis of the gate, a great rectangular building, which served for assemblies, repasts or the [illegible] [illegible] (2[illegible]).

III. Construction.

The Chats built almost exclusively in bricks, only [illegible] [illegible] for lintels and for the execution of pieces of sculpture to be inserted in the masonry. They freely fixed motives in terra cotta on the surfaces.

[illegible] facade,[3] were laid perfectly, so that the nets and joints were scarcely visible. In the sculptured portions of the edifice, they were carved [illegible] completion of the construction.

Note 2. On the contrary, the internal masonry was rather neglected.

The covering was realized by vaults with horizontal courses [illegible]

IV. [illegible]

Cham architecture is recommended by a marked care for the effect of the monumental and [illegible]

Its monuments were elevated on a plinth, itself being above a substructure, they were crowned by a pyramid in four stories, covered by a cylinder with oval termination, and the angles of each story repeated thus accenting terminal, forming pinnacles; from each face projected the strong relief of a false doorway (2[illegible]).

Besides, the bases and cornices were enriched by recessed and contrasted mouldings, the vertical surfaces by pilasters, and the stories of the pyramid by niches, the horizontal edges were decorated by flowers and acroteria, at the angles were projections analogous to gargoyles. Note the taste for outlines in pointed arches.

The Ornamentation consisted in sculptures, whose execution was satisfactory in the good period. They represented [illegible] [illegible], figures at small scale of animals, men and monsters [illegible] [illegible] from Brahma [illegible]

enclosure and on the axis of the gate, a great rectangular b building, which served for assemblies, repasts or the sacred dances (260).

III. Construction.

The Chams built almost exclusively in bricks, only employing stone for lintels and for the execution of pieces of sculpture to be inserted in the masonry. They freely fixed motives in terra cotta on the surfaces.

The bricks were of excellent quality, and at least on the facade, [2] were laid perfectly, so that the beds and joints w were scarcely visible. In the sculptured portions of the edifice, they were carved after the completion of the construction.

Note 2. On the contrary, the internal masonry was rather neglected.

The covering was realized by vaults with horizontal courses corbelled out, which were concealed by wooden ceilings.

IV. Effect.

Cham architecture is recommended by a marked care for the effect of the monumental and secondary reliefs.

Its monuments were elevated on a plinth, itself being above a substructure, they were crowned by a pyramid in four stories, covered by a cylinder with oval termination, and the angles of each story repeated this accenting terminal, forming pinnacles; from each face projected the strong relief of a f false doorway (261).

Besides, the bases and cornices were enriched by repeated and contrasted mouldings, the vertical suffaces by pilasters, and the stories of the pyramid by niches, the horizontal edges were decorated by flowers and acroterias, at the angles w were projections analagous to gargoyles. Note the taste for outlines in pointed arches.

The Ornamentation consisted in sculptures, whose execution was satisfactory in the good period. They represented arabesques, figures at small scale of animals, men and monsters borowed from Brahman mythology -- garuda, naya and makara.

[illegible]

[illegible] Khmer Architecture.

1. Requirements. -- Monumental Chronology and Topography.

Khmer Civilization developed only in the 6 th century A.D., when the principality of Sambor ((Sambupura) -- on the Mekong [illegible] kingdom of Kochan.[1] It attained its climax at the beginning of the 9 th century, the epoch in which the reign of king Jayavarman II (802-869) inaugurated for the Cambodian kingdom an epoch of power and brilliant prosperity. The centre of the empire was then at about 166 miles west of Sambhor, the region of Tonle Sap or the Great Lake, and more particularly north of the western extremity of that expanse of water, the center of Angkor, where arose in the course of the 9 th century the city of Angkor Thom with its walls, palaces, its Temple called Great Bayon, sacred ponds, all in ruins, but susceptible of complete restoration.

[illegible] Cambodia and Cochin China, which had for capital Angkor-Bourei on the right bank of the Mekong between Chan-doc and Phom-penh, was civilized by the expansion of India in the 2 nd cen- [illegible] the 5 th century, it was completely Indianized by a Brahman named Kaundinya. It continued to flourish during the 5 th and 6 th centuries; but in the course of the 7 th it was absorbed by the youthful Khmer state. Its population combined Khmer, Cham and Mosaj elements.

Thenceforth, secular architecture [illegible] portant demands for royal and princely residences, fortifications and works of public interest, such as roads, canals and [illegible]

[illegible] that of the second being decided about the middle of the 10 th century -- resulted in an enormous demand for temples and [illegible] communities and private individuals multiplied pious works in order to acquire "merits" for the hereafter. There may be dated - from the beginning of the 7 th century, religious edifices at Han-chei, Sambor, Banteai-Prei-Angkor, Prasat-Pren-

Chapter 2. Khmer Architecture.

I. Requirements. -- Monumental Chronology and Topography.

Khmer civilization developed only in the 6 th century A.D., when the principality of Sambor ((Sambupura) -- on the Mekong about 13° north latitude -- made itself independent from the kingdom of Founan. [1] It attained its climax at the beginning of the 9 th century, the epoch in which the reign of king Jayarvarman II (802-869) inaugurated for the Cambodian kingdom an epoch of power and brilliant prosperity. The centre of t the empire was then at about 156 miles west of Sambhor, the region of Tonle Sap or the Great Lake, and more particularly north of the western extremity of that expanse of water, the canton of Angkor, where arose in the course of the 9 th century the city of Angkor Thom with its walls, palaces, its Temple called Great Bayon, sacred ponds, all in ruins, but susceptible of complete restoration.

Note 1. Founan, whose area corresponded to the whole of C Cambodia and Cochin China, which had for capital Angkor-baurei on the right bank of the Mekong between Chau-doc and Pnompenh, was civilized by the expansion of India in the 2 nd century A.D. Rich and powerful in the 3 rd and 4 th centuries and in relations with India and China, at the beginning of t the 5 th century, it was completely Indianized by a Brahman named Kaundinya. It continued to flourish during the 5 th a and 6 th centuries; but in the course of the 7 th it was absorbed b: the youthful Khmer state. Its population combined Khmer, Cham and Malay elements.

Thenceforth, secular architecture received numerous and important demands for royal and princely residences, fortifications and works of public interest, such as roads, canals and artificial reservoirs.

The success of the two Brahman and Buddhist religions -- t that of the second being decided about the middle of the 10 th century -- resulted in an enormous demand for temples and monuments, all the greater, because kings, notables, village communities and private individuals multiplied pious works in order to acquire "merits" for the hereafter. There may be d dated:- from the beginning of the 7 th century, religious edidifes at Han-chei, Sambor, Banteai-Prei-Angkor, Prasat-Prah-

[illegible]; from the last quarter of the 9 th century, Temples of Sareo, Bakong, Lolei, Beng Mealea, Mt. Bakong and of Phimeanakas in the Palace of Angkor Thom; from the second half of t the 10 th, those of Ta Prom (Brahman), Banteikedei(Buddhist) and of Sapuch; from the first half of the 11 th century, those of Phnom Chisor, Vat Ek and Prakhan, north of Angkor Thom, finally, from the [illegible] Angkor Vat, etc.

[illegible] the decline of the Cambodian empire, which was exhausted in the course of the 12 th century by unfortunate contests against Champa, the Burmese of Pegou, and finally the Siamese.

[illegible]

During the three and a half centuries occupied by its [illegible], its development was favored by the amplitude of the [illegible]; by the abundance of stone materials -- a coarse but [illegible] limonite and an excellent sandstone, susceptible of a [illegible]; by the remarkable skill of its workmen, and also by the facility of transportation resulting from the regular [illegible] of the country during the rainy season.

[illegible] tions of Brahman Hindoos, natives of the eastern coast of India, and the founder of the kingdom may have come from Java. [illegible] in the course of our analysis, that Khmer architecture appears to be closely related to that of India, and that it has some traits common to those of Champa and of Java. Y Yet it clearly differs from both. By certain traits, it recalls the arts of western Asia, those of Mesopotamian-Persia [illegible] it came under the influence of China.

It influenced the Burmese school and particularly the Siamese.

[illegible]

The type of city revealed by the ruins of Angkor Thom was outlined by a rectangular enclosure, orientated by its sides; from within outwards succeeded a thick rampart of earth 23.5 to 26.5 ft. in height, supported externally by a solid wall, and a moat about 325 ft. wide and filled with water. Five gateways were accessible by causeways, two -- one of which w

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After the 12 th century, Khmer architecture suffered from the decline of the Cambodian empire, which was exhausted in the course of the 13 th century by unfortunate contests agaist Champa, the Burmese of Pegou, and finally the Siamese.

II. Conditions. -- Influences.-- Radiation.

During the three and a half centuries occupied by its career, its development was favored by the amplitude of the programmes proposed to it, by the immense resources placed at its command; by the abundance of stone materials -- a coarse but strong limonite and an excellent sandstone, susceptible of s sculpture; by the remarkable skill of its workmen, and also by the facility of transportation resulting from the regular inundation of the country during the rainy season.

The legendary history of Cambodia mentions several immigrations of Brahman Hindoos, natives of the eastern coast of India, and the founder of the kingdom may have come from Java. We stated in the course of our analysis, that Khmer architecture appears to be closely related to that of India, and that it has some traits common to those of Champa and of Java. Y Yet it clearly differs from both. By certain traits, it recalls the arts of western Asia, those of Mesopotamian-Persia and "Greco-Buddhist" civilizations. After the 14 th century, it came under the influence of China.

It influenced the Burmese school and particularly the Siamese.

III. Programmes and their Realizations.

The type of city revealed by the ruins of Angkor Thom was outlined by a rectangular enclosure, orientated by its sides; from within outwards succeeded a thick rampart of earth 23.0 to 26.2 ft. in height, supported externally by a solid wall, and a moat about 328 ft. wide and filled with water. Five gateways were accessible by causeways, two -- one of which w

was a gate of honor -- in the eastern wall, the others at the middle of each other side. The internal arrangement was was crossed by two corridors; one on the axis of the bridge opened a long and narrow street (52.6 × 11.5 ft); the other formed two areas for the guards.

[illegible] of official buildings, religious edifices, private residences, offices and storehouses. The whole occupied at Angkor Thom a rectangular enclosure 4921 ft. square, orientated by its sides and isolated by the triple obstacle of a wide moat filled with water between two walls from 19.7 to 26.3 ft. high. On the eastern front as a promenade extended a terrace, accessible by five flights of steps and surmounted by a gallery at the middle. At the rear was developed the serail; by a monumental gateway an internal court was entered, from which one [illegible]

[illegible] ith, the dwelling of his divine protectors, the place of his coronation and for great ceremonies. Then was the harem distributed into a central residence for the king, a dwelling f [illegible] western enclosing wall (264).

[illegible]

[illegible] temple to a shrine.[1] In the 8 th century, this elementary p plan was complicated by the addition of a projection on each side. Finally in its maturity, it elaborated three temple p programmes, to which was common the arrangement of the sanctuary, composed of a central holy of holies and a group of sat- [illegible]

[illegible] multiplied and surrounding it at a distance in the Javanese mode;[2] (378; 280); thus at the Temple of Prarhan, the Bayon of Angkor Thom, or the Temple of Bakong (2685 1), where may be respectively counted 48, 50 and 56. The proportions were [illegible] yet that of the Bayon was made oval with 8 projections.

[illegible] Sanctuaries of Hanoi.

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The Khmer palace, after the fashion of the East, was a group of offocial buildings, religious edifices, private residences, offices and storehouses. The whole occupied at Angkor Thom a rectangular enclosure 4921 ft. square, orientated by its sides and isolated by the triple obstacle of a wide moat filled with water between two walls from 19.7 to 26.3 ft. high. On the eastern front as a promenade extended a terrace, accessible by five flights of steps and surmounted by a gallery at the middle. At the rear was developed the serail; by a monumental gateway an internal court was entered, from which one passed into a vast court of honor; there was found the throne hall, reception room, offices, and at the centre being the " "Golden Horn", otherwise the private sanctuary of the sovereign, the dwelling of his divine protectors, the place of his coronation and for great ceremonies. Then was the harem distributed into a central residence for the king, a dwelling f for women, gardenssand offices, the latter placed against the western enclosing wall (264).

Religious Programmes.

The religious architecture of Cambodia at first limited the temple to a shrine. [1] In the 8 th century, this elementary p plan was complicated by the addition of a projection on each side. Finally in its maturity, it elaborated three temple p programmes, to which was common the arrangement of the sanctuary, composed of a central holy of holies and a group of satellite chapels. As at the eastern Mebourne of Angkor, these were sometimes few in number and near it (266, 5); sometimes multiplied and surrounding it at a distance in the Javanese mode; [2] (278; 280); thus at the Temple of Prakhan, the Bayon of Angkor Thom, or the Temple of Bakong (2665 1), where may be respectively counted 45, 50 and 96. The proportions were modest and often very small; the plan was almost always square; yet that of the Bayon was made oval with 8 projections, a porch was sometimes doubled and preceded the small structure.

Note 1. See the Sanctuaries of Han-chei.

One of the two arrangements just mentioned -- the Temple of Baksei, and the Phimeanakas in the Palace of Angkor Thom present examples -- was entirely in height; it perched the holy of holies on the top of a truncated pyramid in seven stories, some solid and the others opening as galleries, all accessible by a stairway placed at the middle of the facade and sometimes crowded with chapels (268, 1).

A second formula was applied at Bayon and Angkor Vat, for example, and developed the theme in area as much as in elevation (265; 266; 269; 272). Rectangular terraces arose successively receding, generally three in number and flanked by stairways on each of their sides; around their exteriors ext- [illegible] as and almost continuous (267; 271), or by single or double cloisters, open towards the exterior or the interior (265); at each angle was erected a pavilion dominating the flights of steps, and at the middle of each side rose a monumental gateway, reached by a great step (265; 267; 271; 272). Sometimes -- as at Bayon and Angkor Vat -- one of the courts enclosed by the galleries of a story were divided into little c courts or into basins by intersecting and angular corridors, covered by porticos (269, 22).

As for the third type, realized at Ta Prom, Kedei etc., it [illegible]

The entirety, which was composed by various additions, such as reading rooms, libraries, cells, sacristies and treasuries, occupied the centre of a vast area bounded by a wall, sometimes preceded by a broad moat filled with water; in its turn, the enclosure was located in a park. The outlines were concentric, and at Angkor Vat be excepted, the orientation was from east to west, the entrance of the sanctuary being opposite the rising sun (265).

Religious or secular, the Khmer monuments were indicated a star, often at more than 5/8 Mile from their sites by the be- [illegible] or of their main axis on a causeway or a series of columns, so that it should be above the inundations; paved and someti- [illegible]

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The entirety, which was composed by various additions, such as reading rooms, libraries, cells, sacristies and treasuries, occupied the centre of a vast area bounded by a wall, sometimes preceded by a broad moat filled with water; in its turn, the enclosure was located in a park. The outlines were concentric, and if Angkor Vat be excepted, the orientation was f from east to west, the entrance of the sancturay being opposite the rising sun (268).

Religious or secular, the Khmer monuments were indicated a afar, often at more than 5/8 mile from their sites by the beginning of a straight avenue, extending along the prolongation of their main axis on a causeway or a series of columns, so that it should be above the inundations; paved and sometimes bordered by a line of steles or a parapet, interrupted o

once or more by a cruciform terrace, whose arms terminated in
371 stairways, this causeway reaching the gate of honor, and extending beyond to the first terrace.

Finally, the necessary complement of every Cambodian programme was one or more rectangular basins (sra), orientated by their sides, and whose dimensions might reach those of a lake, even to 1.74 square miles; the banks were faced with stone, and from the western side projected a sort of flight of steps or pier, from which led the avenue of access to the monument; generally a central island bore a pavilion or a chapel (266).

Special mention should be made of the gates, which were veritable edifices, composed of a pavilion preceded by a porch and by two wings treated as galleries (271; 272).

IV. Construction.

The resistance, sometimes for centuries, of the Khmer monuments to the formidable combination of rain and of tropical vegetation attests the conscience and science of their authors.

They constructed a residence building of carpentry raised on a substructure of hard materials; they freely employed bricks, even for a monumental structure, which they made in a superior manner. They always preferred stone, which they cut in perfection, frequently in blocks of great dimensions; they utilized limonite for substructures and for parts not decorated, with sandstone for the others. They made tiles of terra cotta, and made great use of metals; lead, copper etc.

The remarkable stability of their foundations, so much more significant because of the heavy loads imposed on them, and the climatic conditions were unfavorable, attests the attention accorded to them. Their brick construction was very careful and strongly bonded by an excellent mortar. Their stone masonry was set dry, perfectly regular and so well jointed, that there is often difficulty in distinguishing the blocks. Whether of stone or of wood, the isolated supports were slender, sometimes penetrated by the end of a timber belonging to a side aisle (271; 274).

Khmer architecture constructed a covering, either by a wooden ceiling, or by a tunnel vault or dome of stone, erected in pointed arched form by the process of corbelling; sometimes
373 the vault was visible, sometimes concealed by a ceiling (263).

Its extrados served as the roof, a careful jointing of the s stones ensuring perfect and durable resistance to water (271).

In truth, the spans were of modest proportions. [1]

Note 1. The spans of the tunnel vaults of Angkor Vat do n not exceed 10.2 ft. for a total height of 21.0 ft., and that of the arches of the bridge of Angkor Thom is only 4.26 ft. 2 ins., less than the thickness of the arches.

V. Effect.

Khmer architecture is counted with those styles, which best understood the production of effects. It aspired to, and in the largest measure, it succeeded in arousing an admiring astonishment, pleasure for the eyes and enjoyment for the mind.

It loved material greatness; devised sacred lakes 2.5 miles long, terraces covering 162,000 sq. ft. and rising 91.9 ft. high, colossal entireties, like that of Angkor Vat with its enclosing moat 3.42 miles long and 656 ft. wide, its series of structures extending without interruption for nearly 0.93 mile, its gate of honor with a facade of 770 ft., and its galleries, some reaching a length of 705 ft.

Note 1. At the Temple of Bakong are counted no less than 97.

It was again pleased to astound by the multiplication of elements; for example, erecting veritable thickets of towers a and spires. [1]

It particularly aimed at impression by an appearance of height and slenderness. It multiplied levels, raising the sanctuary to 65.6 ft. or more above the soil on a series of terraces, in fact even on a stepped frustum of a pyramid. [2] Besides, it sought to make all secondary reliefs suited to raise the eyes; rapid inclination of very steep stairways, erection of towers and domes of pointed outline, sharp terminals and pointed spires (271; 272); better still, it had recourse to artifices producing perspective illusions, such as a progressive narrowing of stairways upwards, and a symmetrical diminution of the heights of the figures placed on the steps of the strings. [1]

Note 2. At Angkor Vat, the graduated heights proceed as f follows. The area of the enclosure rises 5.6 ft. above the natural soil; the promenade is 3.3 ft. higher; the first terrace is 13.1 ft. above the promenade; the second terrace is

19.7 ft. above the first; the third terrace is 42.6 ft. above the second; the site of the Temple is 54.0 ft. above the plain.

Note 1. The height of the last figure at the top does not exceed one third of the first one at the bottom.

Khmer architecture was neither less attentive nor less skilful in producing impressions of a moral order; thus it retarded the arrival at the principal building by reducing the route of access to the narrow band of a long causeway (265), and by opposing to the visitor the obstacle of high flights of s steps and of very steep stairways (271), several times repeated.

Effects of Relief.

Impassioned for picturesque effect, it had the good taste to first seek it in the monumental order.

The general form of its productions had movement; in plan by numerous projections, by the ample prominence of flights of steps and terraces, by the projections of pavilions and portals, by the enlargement of causeways in cruciform terraces (269); in elevation by the striking relief of the terraces in stories and of stepped pyramids, by numerous towers, spires and turrets, unequal in height as in size. (266, 1; 272). Sometimes -- for example at the Bayon of Angkor -- in view of recalling Brahma with four faces, to the religious edifice w was given the appearance of a colossal human bust with four faces, orientated toward the cardinal points (263).

The secondary relief tends in the same direction. The wall was bordered at top by the projection of a strong cornice and by a series of pointed arches; its surface was accented by s strongly projecting bosses, by the projections of pilasters, engaged columns, sculptures, and by the recessed openings, actual or similuated (267; 273). The domes rose in stories or were serrated (271; 272); the extrador of the vaults was ribbed and imbricated (271). The strings of the stairways were stepped, and frequently the fronts of the steps were recessed at the bottom (271).

On the isolated support was usually imposed the form of a square prism; even if frequently without a base, it was always crowned by a capital. Both were composed of a pile of square cushions with convex edges, equal in area but not in th-

thickness, and their appearance recalls the Tuscan order(271; 274, 1). The shafts of the columns present the appearance of balusters of turned wood, ornamented by astragals, blocks and knobs; the capital and base are sometimes cut in the image of a square slab, sometimes in that of the corolla of a lotus. (274, 2).

Yet in the number of characteristics and also of the qualities of Khmer architecture figures the faculty of uniting with the taste for the picturesque that of order. All its compositions are rigorously centered and axial; their elements balaance; their outlines are inscribed within parallellograms tending to squares (266; 268; 269).

Effects of Ornamentation.

Yet the largest part was given to the effects of ornamentation.

By the evidence of the texts, we know that metallic overlays were much in favor; they consisted of plates of gilded copper, with which the domes especially were covered, and of gold leaves applied to the internal surfaces, almost always covered by a layer of vermilion.

The relief of Cambodian monuments was complicated by a profusion of ornaments and figures -- light embroideries, low or high reliefs, and even in the round. In a single edifice are counted by hundreds the statues, by ten thousands the sq. ft. of reliefs, and figures by a dozen thousands. Decoration was inspired by nature, particularly by animal; by the views of life, and by religion. The floral repertory comprised flowers, rosettes, foliage, rich and varied scrolls (275; 276), t the entire fauna of the country was put under contribution, but the elephant was the preferred model. The part of the genre or the historical subject was considerable; hunting scenes, royal parades, religious ceremonies, demons and girls. Fanciful figures were multiplied; dwarfs and giants, serpents with seven heads (naga)(270), winged monsters (garuda), etc.

The execution was very unequal; quite careful or rough, according to the prominence of the motive; the best portions s show a singularly skilful chisel and a very refined eye.

Guided by a very lively feeling for the picturesque and a very assured taste in architectural requirements, Khmer art

frequently succeeded in impressing a monumental shape on ornaments, even combining a useful form and ornamental sculpture in the most ingenious and sometimes the happiest fashion. For example, we cite great human and monstrous figures, carved on a facade so that they appear to support the cornice on their heads or their raised arms; fronts of elephants projecting f from a wall as if their bodies were engaged in the mass to receive the load of the upper courses; two serpents facing e each other or outwards, that outline a pediment; a colossal serpent borne by giants crouching or sitting on the edge of a terrace or of a bridge, so as to form a parapet (270).

In brief, in spite of a tendency to excessively complicate form and to abuse ornamentation, Khmer architecture occupies an eminent place in the history of the art of building, for without speaking of the remarkable quality of its construction, it has created magnificent groups, of grand and poetic appearance, tasteful details, and some outlines of rare elegance.

I. Requirements. -- Monumental Chronology and Topography. -- Conditions.

The ancient history of Java is entirely legendary. It places in the decline of the 1st century A.D. the arrival in the island of the first of a series of a stream of missionaries and of immigrants, who were to introduce there the faiths and the civilization of India. A tradition preserves the memory of the coming of natives of eastern Deccan and of the country of Kalinga, between the Godavery and Mahanadi rivers.

[illegible]

th century, of several thousands of men from Gujarat, otherwise termed the northwest of India. On the other hand, the Chinese Fa-hian, who visited Java in 414, informs us that at that date, the island was devoted to Brahmanism, and contained but a small number of Buddhists. Finally there is the question of an active Buddhist propaganda in the 5th century by missionaries from the country of the upper Indus.

It is certain that the eastern half of Java alone offers to architecture favorable human conditions, that there exist no monuments earlier than the 8th century, and that none are later than the triumph of Mohammedanism in the island in 1479; that after the 12th century a decadence occurred, finally, that the demand was at first especially Buddhist, and then after the 16th century, almost exclusively Brahman.

The principal evidences for the architectural history of Java are :-- for the 8th century, the Buddhist temple of Tjandi Kalasan and the monastery of Tjandi Sari; for the 9th, the great Buddhist Temple of Boro Boudour and the [illegible]

[illegible]

[illegible], also Buddhist -- on the site of the [illegible] notably with the Tjandi Seven (and of [illegible]); the Brahman sanctuaries of the plateau of Dieng (10th to 12th [illegible]

[illegible]

region of Mulong (14th century) -- Tjandi Jago, Tjandi Singasari, Temples of Panataran -- and those of Suku (about 1440).

[illegible]

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The principal evidences for the architectural history of J Java are :-- for the 8 th century, the Buddhist Temple of Tjandi Kalasan and the Monastery of Tjandi Sari; for the 9 th, the great Buddhist Temple of Boro Boudour and the neighboring sanctuary termed Tjandi Mendoet; the group of Temples of Prambanam, also Buddhist -- on the site of the ancient capital -- notably with the Tjandi Seweu (end of the 11 th century); the Brahman sanctuaries of the plateau of Dieng (10 th to 12 th centuries), particularly the Tjandi Bhima; the Temples of the region of Melong (14 th century)-- Tjandi Jago, Tjandi Singasari, Temples of Panataran -- and those of Suku (about 1440). Note further the existence in the adjacent island of Bali, of monuments of the late epoch and of inferior quality.

Javanese architecture is derived from that of India. It ex-

exhibits the twofold influence of the art of Deccan (page 298) and of the Hellenizing formula established in the upper basin of the Indus (page 297). Yet it has given its own tone, entirely worthy of attention and of admiration in certain respects.

Recall that striking resemblances are observed between its productions and those of the Cham and Khmer schools. [3]

Note 3. See page 381; Figs. 266, 1,5; 278, 2 - 4; Note 2 on page 402.

401 II. Programmes and their Realizations.

402 Javanese architecture realized two sorts of religious programmes.

A first one comprised the erection of a sanctuary conformed to the Brahman style of India; a small square chapel preceded by a porch or with a projection on each side, or abain -- such as Tjandi Jabang -- circular with four rectangular projections toward the cardinal points; it was sometmies placed on the ground (279) -- as the case for the edifices of the plateau of Dieng,-- sometimes at the top of a series of terraces with ample flights of steps in front (278, I) -- like those of the region of Melong, -- sometimes on the top of a high p plinth furnished with a stairway on one of its sides -- such as Tjandi Jabang.

More original, the second formula composed a monumental group by the regular arrangement around a central monument of a number, sometimes very considerable, of entirely similar l little structures. [1] Two variants of this type are known, one illustrated by the Temple of Boro-Boudour (278, 4,5; 280), t the other by the Temples of Prambanam, notably by that named Tjandi Seweu (278, 2,3).

Note 1. Compare the realization of an analagous programme by Khmer architecture. Page 389.

At Boro-Boudour rises a high square terrace in five steps, [2] with a rectangular projection on each side; on the front of each step, interrupted by a stairway at the centre, commencing beneath a triumphal arch, is arranged a series of niches, 436 in total number; on the upper terrace rises a circular p platform in three receding stories, at the edge of which rise 403 dagobas (page 304) to the number of 72. A 73 rd one, designed

at a much larger scale, and which is the stupa or monument p proper, is erected at the centre of the uppermost circle.

Note 2. The terrace occupies a square 394 ft. on each side.

The second realization reduces the height of the substructure and the number of steps, replaces the dagoba by a cruciform sanctuary, and ranges around it in a square a series of entirely similar chapels, whose openings are either turned t-toward the central edifice or toward the exterior; the Tjandi Seweu exhibits 240 of these, arranged in 4 rows, each measuring 11.8 ft. on each side (278, 2).

The specimen of a Javanese monastery offered by the Tjandi Sari consists in three stories on a rectangular plan; each is divided into three chambers, the middle one being lighted by one window, the outer ones by two.

As for the house, the representations possessed by us prove, that it was composed of verandas in great measure, galleries and loggias. It was elevated on a substructure or on piles. The granaries are distinguished by the outward inclinations of their sides.

Note 2. See the reliefs of the Temple of Boro-Boudour.

Note 3. See Fig. 296, a Laotian realization of this kind of elevation.

III. Construction.

Javanese construction was of stone or of bricks and wood. In the first case it was set dry with care and regularly; it excluded the idea of the isolated support and erected arches and vaults with corbelled courses. In the second mode it raised columns and realized the covering by carpentry.

IV. Effect.

The arrangements just analyzed indicate a very lively taste and a very assured sense of the monumental effect of picturesque order. The substructures with broken profiles and sometimes very high, the multiplied stairways in stories, the projections of pedestals and of sanctuaries, the grouping of small shrines, combine energetically for the creation of piquant appearances full of movement (280). The impression is confirmed by the form of the crowning parts; it is indeed that of a lofty stepped form, sometimes ornamented by a niche for a statue at the middle of each side of the steps and bordered

at each angle by a reduction of its mass (279). [1] Finally, t the eye is interested by the perception of the accented and varied recessions of plinths and projecting cornices, pilasters, enclosures of openings and of niches, broken strings of stairways, crestings, pinnacles, detailed and contrasted mouldings (279; 280; 281; 282).

Note 1. Compare the reliefs of the Cham temples; page 382.

Yet the Javanese style is likewise characterized by seeking qualities of harmonic order; by the love of rhythmic arrangements, regular and even symmetrical; by a marked care for disciplining accidental forms, and for ensuring some grand outlines and reliefs. Certain monuments, notably in the group on the plateau of Dieng, are distinguished by a freedom and a p purity of lines almost classical.

The ornamentation is very abundant, but is clearly subordinate to the architectural relief. It is composed of ornamental and of significant sculpture; on the one hand, the sacred images, religious themes, sacred legends, also genre and historical scenes (282); on the other being an abundant decoration by very flowery and complicated scrolls, lotuses arranged in bands, richly wrought pateras, monstrous and grimacing figures, sometimes realized at a great scale (281). The series of reliefs that decorate the Temple of Boro-Boudour would extend for nearly 3.1 miles, if placed end to end!

The execution is often remarkable and is sometimes excellent.

[illegible]

[illegible] Requirements. -- Monumental Archaeology and Topography.

The [illegible] of Burma -- i.e., that of the lower basins of the Irrawaddy and the Salouen and on the eastern coast of the Gulf of Bengal is composed of Tibetans in the north and centre, of Indo-Chinese, analogous to the Khmers and termed [illegible]

[illegible]

The latter commenced to arrive in the [illegible] of our pagan [illegible], and they came in great numbers in the first [illegible]

[illegible]

Pagoda on the Irrawaddy indicate their principal settlement. [illegible] by the sea route and founded flourishing [illegible] on the coast and at the mouths of the Irrawaddy and of the Salouen; the most important, Thaton on the lower Sitang, from before the beginning of the Christian era and for [illegible] centuries afterwards, was the emporium of the commerce between India and western Asia with the extreme East.

It was destroyed in the middle of the 11 th century by the Palain Kingdom of Pegou, created about the 6 th century, and [illegible] group and powerful until the middle of the 18 th century; its great centres were Prome and Pegou.

In the 9 th century was organized a properly Burmese state [illegible] the Tullanized provinces of the north and the domain of the Palains in the south, whose capital Pagan covered more than [illegible] square miles, and was taken in 1289 by the Mongols of [illegible]. Its fortune was brilliant in the 14 th and [illegible] centuries, when its kings reigned at Ava, built in [illegible], and [illegible] more in the [illegible] th and the beginning of the 19 th, the epoch when the seat of government was a Amarapura, [illegible] in [illegible].

[illegible] from the 8 th century B.C., the Burmese peoples [illegible] and [illegible].

At Thaton may still be seen pagodas older than the 11 th century. Prome [illegible] monuments of the 7 th, 8 th and 9 th

Chapter 4. Burmese Architecture.

I. Requirements. -- Monumental Chronology and Topography.

The population of Burma -- i.e., that of the lower basins of the Irrawaddy and the Salouen and on the eastern coast of the gulf of Bengal is composed of Tibetans in the north and centre, of Indo-Chinese, analagous to the Khmers and termed Talains or Mons in the south; of Hindoos in the north and the extreme south.

The latter commenced to arrive in the decline of our pagan period (B.C.), and they came in great numbers in the first c centuries A.D. Some came from Gangetic India by land across Assam and established themselves in the north; the ruins of Tagoung on the Irrawaddy indicate their principla settlement. Others left Orissa by the sea route and founded flourishing colonies on the coast and at the mouths of the Irrawaddy and of the Salouen; the most important, Thaton on the lower Sitang, from before the beginning of the Christian era and for c centuries afterwards, was the emporium of the commerce between India and western Asia with the extreme East.

It was destroyed in the middle of the 11 th century by the Talain kingdom of Begou, created about the 6 th century, and which with alternating progress and decadence remained prosperous and powerful until the middle of the 18 th century; its great centres were Prome and Begou.

In the 7 th century was organized a properly Burmese state between the Indianized provinces of the north and the domain of the Talains in the south, whose capital Pagan covered more than 27 square miles, and was taken in 1284 by the Mongols of Khoubilai Khan. Its fortune was brilliant in the 14 th and 17 th centuries, when its kings reigned at Ava, built in 1364, and still more in the 18 th and the beginning of the 19 th, the epoch when the seat of government was a Amurapura, created in 1788.

Fervent adepts in Buddhism, that Hindoo missionaries brought to them from the 3 rd century B.C., the Burmese peoples manifested their faith by incessant demands for sacred monuments and monasteries.

At Thaton may still be seen pagodas older than the 11 th c century. Prome retains monuments of the 7 th, 8 th and 9 th

ceremonies (Temples of Sacrifice), Dragons and Lotus-flowers. At Angkor, more than 600 sanctuaries recall a great impulse in a consecration, which was developed in the course of the 10 th, 11 th, 12 th and 13 th centuries. Temples of Bakongkong (and of first half of 10 th century); of Angkor, however, Ban Ta-Pa and Prasat Kravan, dating from the 11 th century: of Preah-Vihar, Sambhipuran and Banteaksrei, erected in the 12 th. We find-ther mention the Khmer version of Hanuman as Reyomkhi as a [illegible] as Ramayana: Temples of Bayonnang, Angkor and Banteay.

II. Conditions. -- Influences. -- Tendencies.

Khmer. First, that of India, resulting from the religious a[illegible] caused the artistic formula of Orissa (page 200); then some of the arts of Magal and Pirsel, explained by the geographical p[illegible] [illegible] population was originally from upper Asia; however, that of Khmer and Chinese architecture, favored by the radiation of Chinese civilization and by the political expansion of Chi-na [illegible] [illegible] [illegible]

centuries (Temples of Baubaugyi, Payaman and Lemyet-hna). At Pagan, more than 800 sanctuaries recall a great impulse in c construction, which was developed in the course of the 10 th, 11 th, 12 th and 13 th centuries. Temples of Pathothamaya (end of first third of 10 th century); of Ananda, Nagayon, Nam Pa-ya and Choue Zigon, dating from the 11 th century; of Thatpyn-nyu, Gotapallin and Tsulamani, erected in the 12 th. We further mention the Choue Hmadou at Pegou; the Kyauktaugyi at A Amarapura (1847); Choue Gadon (15 th century, restored in 1768) at Rangoon; Temples of Myokaung, Akyab and Sandoway.

II. Conditions. -- Influences. -- Radiation.

Burmese monuments manifest the competition of several influences. First, that of India, resulting from the religious a and civilizing effect of that country, that especially introduced the artistic formula of Orissa (page 298); then that of the arts of Nepal and Tibet, explained by the geographical p position of Burma and the fact, that the greater part of its population was originally from upper Asia; further, that of Khmer and Chinese architecture, favored by the radiation of Cambodian civilization and by the political expansion of China; finally, that of "Greco-Buddhist" Asia, and more again, that of Mesopotamian-Persian Asia. (Pages 1, 297).

Yet the Burmese school perfectly assimilated what it borrowed, and it marked its productions with a very personal stamp, frequently very original and of the highest quality.

Its radiation very energetically influenced the development of a younger sister, Siamese architecture (page 414).

III. Programmes and their Realizations.

The Burmese palace was designed in the mode of the extreme East. In the interior of a rectangular enclosure by a moat filled with water between two walls, it comprised beyond the entrance a first court bordered by administrative buildings; a second in which was found the throne hall, indicated by a wooden spire with multiple roofs receding behind each other; a harem, and finally the o fices.

Burmese edifices bor religious purposes are of three kinds; monuments of the category of topes (zedi), temples and monasteries.

On a stepped terrace, generally square and sometimes polyg-

[illegible] sections, measures [illegible] trees, but [illegible] [illegible] a [illegible] with [illegible] [illegible] a [illegible]. [illegible] [illegible] [illegible]

polygona, frequently accented in plan by projecting rectangular bastions, repeated several times, the first place being a mass with curved outline enclosing a small central cell; in this mass are sometimes recessed four niches opposite the cardinal points, [1] and it is surmounted by a tall conical spire, crowned by an image of an umbrella in gilded iron. Reduced repetitions of the central dagoba frequently surround it, erected at the angles or placed along its entire perimeter; this sometimes permits a stairway at the middle of each step. (286, 1). [2]

Note 1. Compare the Nepalese formula for the same programme. Page 364.

Note 2. The Shoue Hmadou covers more than 21,500 sq. ft.; the first step is 9.8 ft. high and the second is 19.7 ft. T The upper termination extends to 348 ft.; 128 little dagobas may be counted.

The temple is sometimes a chapel on a square plan, preceded by a vestibule forming a porch; sometimes a sanctuary elevated on a square terrace, raised and much larger. [3] The latter has a projection on the front side or on all four sides (284; 286, 3); it is solid in the interior, or a peripheral corridor separates a nucleus, sometimes containing a deep niche on each side, intended to shelter an image of Buddha. [1]

Note 3. The Temple of Ananda at Pagan occupies a square m measuring 197 ft. on each side and attains to 180 ft. above the ground.

Note 1. Compare the resemblance of this arrangement with that realized in numerous examples at the ruins of Idikutschri in eastern Turkestan (page 377).

In the category of buildings for monastic purposes, it is proper to mention the thein, as an example of which may be cited the Upali Thein at Pagan, a work of the 13 th century; like the Hindoo chaitya, it is a rectangular interior divided by two arcades into a middle and two side aisles.

IV. Construction.

Burmese construction has always utiliqed wood for domestic buildings and almost exclusively bricks for relegious edificces.

In the number of its most characteristic traits, figures t the use of the radial arch and tunnel or half tunnel vaults, built in slices in the mode of Mesopotamia (287), [2] and excep-

exceptional in the south and southeast of Asia.

[illegible]

[illegible] were originally from upper Asia.

V. Effect.

[illegible] than in India, for it subordinated the details of secondary relief to some grand effects of outline and mass.

A more slender shape restricts the analogy presented by Burmese edifices to those of India. Thus that the tope tends to be ovoid and sometimes bell-shaped, often with interruptions of the profile at about two-thirds its height by the projection [illegible] ented by a tall pinnacle crowned at the top. Likewise for the temple, whose truncated pyramid is crowned by a slender sikhara with concave outline (264; 265).

Various peculiarities imply a taste for picturesque relief; the projection of bastions repeated several times on the facades of the substructure; a cruciform arrangement of the sanctuary [illegible] for the covering of buildings for habitation, roofs in the Nepalese or Chinese fashion; monumental portals, which recall [illegible] by pavilions; raising the edges of roofs by sharp and profiled aeroterias and foiled [illegible] of arches (266, 3) etc.

The Burmese school also had a passion for ornamentation as much as any of its rivals in the extreme East. Its elevations in bricks were masked by coverings of cement or stucco, or by the attachment of panels of terra cotta or faience; it covered carpentry and woodwork with lacker; it lavished [illegible] friezes, festoons, pendants, garlands attached to monsters and [illegible] masks (267).

exceptional in the south and southeast of Asia.

Note 2. Recall that the procedure was common in eastern T Turkestan (page 377), and that a portion of the Burmese people were originally from upper Asia.

V. Effect.

In Burma, the conception of the effect was more monumental than in India, for it subordinated the details of secondary relief to some grand effects of outline and mass.

A more slender shape restricts the analogy presented by Burmese edifices to those of India. Thus that the tope tends to be ovoid and sometimes bell-shaped, often with interruptions of the profile at about two-thirds its height by the projection of an annular band; the aspiring appearance is again accented by a tall pinnacle drawn out at the top. Likewise for the temple, whose truncated pyramid is crowned by a slender sikhara with concave outline (284; 286).

Various peculiarities imply a taste for picturesque relief; the projection of bastions repeated several times on the facades of the substructure; a cruciform arrangement of the sanctuary; a row of diminutives of itself around the monument; f for the covering of buildings for habitation, roofs in the N Nepalese or Chinese fashion; monumental portals, which recall those of our cathedrals (284); pronounced bosses; walls crowned by battlements; raising the edges of roofs by sharp and profiled acroteries, and foiled shapes of arches (286, 3) etc.

Ye the Burmese school also had a passion for ornamentation as much as any of its rivals in the extreme East. Its elevations in bricks were masked by coverings of cement or stucco, or by the attachment of panels of terra cotta or faience; it covered carpentry and woodwork with lacker; it lavished gilding; it multiplied frescos and ornamental sculptures; bands, friezes, festoons, pendants, garlands attached to monsters and grimacing masks (268).

I. Siamese Architecture.

The history of Siamese architecture commences in the decline of the 13 th century with the foundation of Sokothai (Sukhodai), capital of the kingdom, that a portion of the Thai people, originally from S.-tchouen or from eastern Tibet, began to establish in the 10 th century in the upper basin of the Menam, and which was developed at the expense of the Khmer empire. The young city rapidly increased, and until the middle of the 14 th century, the time at which it was abandoned, it was fil- [illegible] distinguished one, named Vat Chi. A little to the south of Sokothai may be seen imposing vestiges of another city of the same epoch, Kamphanglaya. To Sokothai succeeded Ayouthia, that the Burmese destroyed in the middle of the 18 th century; European travelers have vied with each other in celebrating [illegible] as invaded by the jungle. On the other hand, important temples [illegible] ury at Bangkok, the present capital.

Siamese architecture borrowed from its older Khmer and Burmese relatives. It also felt the influence of northern India, of Nepal and of China.

Programmes and their Realizations.

The plan of the Siamese palace, such as described by the v visitors to Ayouthia in the 17 th century,[1] recalls that of the residences of the Khmer kings. In the interior of a double enclosure succeed each other [illegible] devoted to storehouses, offices, and the lodgings of officials; a royal residence on a cruciform plan and crowned by a high pyramid in stories; lastly, the women's residence. The gardens are divided into compartments defined by rows of [illegible] set on edge and separated by narrow walks; they are [illegible] water.

Note 1. See the Reports of Cerdoses and of Ko Kohima.

[illegible]

414 Chapter 5. Siamese and laotian Architecture.

I. Siamese Architecture.

Monumental Chronology and Topography. -- Influences.

The history of Siamese architecture commences in the decline of the 13 th century with the foundation of Sokothai (Sukhoda), capital of the kingdom, that a portion of the Thai people, originally from S.-tchouen or from eastern Tibet, began to establish in the 10 th century in the upper basin of the Menam, and which was developed at the expense of the Khmer empire. The young city rapidly increased, and until the middle of the 14 th century, the time at which it was abandoned, it was filled with palaces and Buddhist sanctuaries, among which may be distinguished one, named Vat Jai. A little to the south of Sokothai may be seen imposing vestiges of another city of the same epoch, Sajjanalaya. To Sokothai succeeded Ayouthia, that the Burmese destroyed in the middle of the 18 th century; European travelers have vied with each other in celebrating the monumental splendor of the second, still attested by ruins invaded by the jungle. On the other hand, important temples arose at Laphabouri, and after the end of the 18 th century at Bangkok, the present capital.

Siamese architecture borrowed from its older Khmer and Burmese relatives. It also felt the influence of northern India, of Nepal and of China.

Programmes and their Realizations.

The plan of the Siamese palace, such as described by the v visitors to Ayouthia in the 17 th century, [1] recalls that of the residences of the Khmer kings. In the interior of a double enclosure succeed each other beyond the entrance; courts devoted to storehouses, offices, and the lodgings of officials; a royal residence on a cruciform plan and crowned by a high pyramid in stories; lastly, the women's residence. The gardens are divided into compartments defined by rows of bricks set on edge and separated by narrow walks; they are planted with trees and flowers and are cooled by basins and running water.

Note 1. See the reports of Gervaise and of La Loubere.

The religious architecture of Siam has applied two formulas, one imported from Cambodia -- which we shall neglect (page 3

389), and another peculiar to Siam, and whose analysis is as follows (290). A rectangular enclosure (Kampheng keo) with facade toward the east is crowded by various edifices. First opposite the entrance, one or more sanctuaries (bot) are reserved to the priests for ordinations and assemblies; the bot is an oblong rectangular building, accessible on the eastern side, preceded by a porch (na-muk) and divided by rows of columns into a middle and two or more side aisles; in the walls of the latter are opende windows, whose function is completed by clearstory windows arranged in the sides of the middle aisle over the roofs of the side aisles; at the rear, a great altar (phra-sok) bears a statue of Buddha (290, 2; 292). There are also the phra-chedi, dagobas or reliquaries of the canonical type but very slender, on a circular plinth and with outlines in bell form, surmounted by a square block and crowned by an annelated spire ending in a sharp point (291); the phra-prang, very small chapels crowned by the trident of Siva, placed on a high pedesta, and accessible by a narrow and steep stairway (291); shrines with statues of Buddha or with imprints of his feet, some sjuare (mondob), the others cruciform (chatta-muk), conceived to shelter Brahma with four faces, a and later four images of Buddha; temples (kamburien); halls for prayer (vihan); sacred libraries (ho'trai); shelters for pilgrims (sala); monastic lodgings (ka-ti), campaniles (ho' rakhang), sacred basins (sa). The group beass the name of Vat.

417 Construction.

In Siam, according to the custom of the extreme East, secular architecture substantially employs wood and bricks, the latter of mediocre quality. Religious construction is skilful in stone masonry, in dressed sandstone for the careful parts and for those to be sculptured; in limonite for the remainder. Of stone are fashioned the isolated supports in buildings with several aisles; their caps bear a roof in carpentry, covered by glazed tiles, while in Chinese fashion, mortises cut in their shafts receive the ends of beamr and the rafters of the covering of the side aisles (292). Terra cotta is much appreciated for constructing balusters set in the openings of windows, and there is great use made of lime mortar for c casting in moulds sculptures for placing on the masonry.

Effects.

[illegible] by a mode of crowning religious edifices by sharp spires or by tall cylinders with ovoid terminations, analagous to the Chinese of Orissa (page [illegible]), and the covering of secular structures by high roofs in stories, after the Chinese [illegible] curvature of the ridge.

Its passion for the effect of ornamentation is shown by an [illegible] glass beads, paintings, silvering and gilding.

II. Laotian Architecture.

Monumental Chronology and Topography.

[illegible] of the Mekong, the Laotian Tais installed themselves in the middle part of that of the Mekong. About the 12 th century was established a powerful kingdom termed Lan-Xang, with Vieng-Chan as capital; it extended from about 20° north latitude to the rapids of Khong. In the 17 th century, it was so [illegible] century, it could not resist the repeated attacks of the Tiamese, who completed its subjugation in 1[illegible]. On several occasions, portions of Lan-Xang became independent principalities; [illegible] the province of Luang-Prabang, which prospered about the middle of the 14 th century and till the beginning of the 16 th; also those of Xieng-Mai, of Bassac,[2] etc.

[illegible] the account of the Jompong of the Indies, to the kingdom of [illegible] (Lan-Xang).

[illegible]

[illegible]

Of the architectural production of the Laotian Tais, there remain numerous evidences at Vieng-Cham, which in 1[illegible] counted 20 temples, among which were the Vat-Phra-Kao, the shelter of the "Emerald Buddha", one of the most celebrated images of Sakya-Mouni;[3] at Say-Fong, where have been recognized 27 sanctuaries; at Luang-Prabang, Xien-Sien, Xien-Zhang, Xien-Mai etc.

Effect.

Siamese architecture manifests its love for picturesque effects by a mode of crowning religious edifices by sharp spires or by tall cylinders with ovoid terminations, analagous to the Sikhara of Orissa (page 321)(291), and the covering of s secular structures by high roofs in stories, after the Chinese fashion, with crockets at the angles, but without a concave curvature of the ridge.

Its passion for the effect of ornamentation is shown by an extravagant profusion of sculptures, facings of faience and glass beads, paintings, silvering and gilding.

II. Laotian Architecture.

Monumental Chronology and Topography.

While the Siamese Tais established themselves in the valley of the Menam, the Laotian Tais installed themselves in the m middle part of that of the Mekong. About the 13 th century was established a powerful kingdom termed Lan-Xang, with Vieng-Chan as capital; it extended from about 20° north latitude to the rapids of Khong. In the 17 th century, it was so flourishing, that it passed for one of the richest countries of the extreme East. [1] Weakened at the beginning of the 18 th century, it could not resist the repeated attacks of the Siamese, who completed its subjugation in 1826. On several occasions, portions of Lan-Xang became independent principalities; such was the province of Luang-Prabang, which prospered about the middle of the 14 th century and till the beginning of the 18 th, also those of Xieng-Mai, of Bassac, [2] etc.

Note 1. See the journey made by G. van Wusthoff in 16115 on the account of the Company of the Indies, to the kingdom of "Loumen" (Lan-Xang).

Note 2. For the monumental topography of Laos, see Fig. 289).

Of the architectural production of the Laotian Thais, there remain numerous evidences at Vieng-Cham, which in 1644 counted 25 temples, among which were the Vat-Phra-keo, the shelter of the "Emerald Buddha", one of the most celebrated images of Sakya-Mouni; [3] at Say-fong, where have been recognized 27 sanctuaries; at Luang-Prabang, Xien-Sien, Xien-Khang, Xien-Wai etc.

Note 3. The statue was brought by the Siamese to Bangkok, where it is honored in the pagoda of the Royal Palace.

Laotian architecture appears nearly related to the modern Siamese; indeed, according to the natives, the Siamese imported by force Laotian artists to the banks of the Menam. It is certain that the Laos, like Siam, was influenced by Khmer.[4]

Note 4. Note the legend that attributes the foundation of Say Fong to a hero from the south.

Programmes and their Realizations.

The Laotian temple groups a sanctuary, memorial monuments or reliquaries (that), chapels, a campanile, sacred libraries and lodgings for the priests.

The plan of the sanctuary presents a curious analogy to that of the Grecian temple (293; 294). On a substructure more or less elevated, sometimes profiled in steps, with front and rear stairways, rises a rectangular interior, accessible by a principal doorway opened at the middle of one end, and by two small ones, either pierced at the sides of the former, or at the ends of the side walls. Lighted by windows at mid-height, it contained at the rear a great altar, supporting a statue of Buddha and preceded by a pulpit; sometimes two rows of columns separate a middle and two side aisles. Before each end is a double portico, and when the hall is undivided, lateral colonnades form a peristyle, whose intercolumniations are partly closed by perforated parapets or by balustrades. The sanctuary is frequently at the centre of a paved court, bordered by a portico, whose rear wall contains niches to shelter Buddhas.

Note 1. (294). The original drawing is the work of Delaporte.

The that is a dagoba analagous to the Siamese Phra-chedi ((291); it forms a monumental realization in the shape of a h high terrace in two stories, supporting on the upper platform a great dagoba surrounded by several smaller ones.[2]

Note 2. At the That-Luong of Vieng-Chan are counted 26 small dagobas.

The small structures for use as libraries are little square or rectangular cells, lighted by windows and raised on plinths.

Construction.

Bricks and wood were the ordinary materials for Laotian con-

construction; it employed stone but rarely, for substructures and isolated supports. It made much use of coatings of stucco. Hostile to verticals, it adopted only battering walls, or overhanging ones in the case of a library (296); trapezoidal o openings; piers with sections diminishing from base to top.

The covering was realized by a wooden ceiling. The roof w was high and projected very much, and when it covered a temple, it was divided in tow parts, one corresponding to the interior, and the other to the front and rear porticos, and according to the case, also to the side aisles or colonnades; the former had two slopes, the latter being sometimes a shed roof, sometimes similar to and symmetrical with that of the nave, the gables being closed by screens of carved wood (294; 295).

Effect.

The relief of Laotian edifices was very picturesque. It comprised effects of secondary reliefs and of details resulting from moulding the substructures; from an enclosure of the doorways by recurved architraves, and of the windows by the aid of pilasters, with a stepped triangular pediment; from t the form of the capitals in the image of two superposed series of lanceolate leaves, the upper row ascending and the lower leaves being recurved, enclosing the cap of the pier (294); from a construction of the ceiling in coffers, and from the projecting horns at the extremities of the ridge and angles of the roof (294; 296).

Rich to excess, the ornamentation comprises stuccos, paintings in a dominant red, facings of faience and glass beads, with gilding in abundanee. The decoration consists in a profusion of slender ornaments,-- arabesques of leaves and flowers, small religious or fantastic figures, -- which detach t the contrast of their gilding from the dark red of the background (294; 296). The original of 296 is by Delaporte.

I. Departures. -- Kamakura, Ashikaga and Tokugawa.

The ancient history of Japanese architecture does not precede the beginning of the 7 th century A.D., and its development extend to the 17 th.

Its advancement, which became evident in the 14 th century, was brought by assimilation of China and Korean remains, a possibility of the two from the corresponding arrangement of the two countries at Tokugawa and Kamakura. [illegible] at of the act of omitting from the Chinese era, the wooden moving down in order from Japan as the middle of the 7 th century -- and on the island, of the best for the [illegible] [illegible] and [illegible] [illegible] [illegible] and [illegible] for [illegible].

In the [illegible] [illegible] (a [illegible] [illegible] [illegible]), tradition gives [illegible] to the [illegible] [illegible] of the [illegible] [illegible] [illegible]

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Section III. Japanese Architecture.

I. Requirements. -- Monumental Chronology and Topography. ..The assured history of Japanese architecture does not precede the beginning of the 7 th century A.D., and its development ended in the 17 th.

Its advancement, which reached a climax in the 17 th century, was favored by abundant religious and secular demands, r resulting on the one hand from the competing advances of the two religions of Shinto and Buddhism, the first being a client of the art of building from the Christian era, the second having been imported from Corea at the middle of the 6 th century -- and on the other, to the need for the palaces and fortresses of powerful sovereigns and princes, interested in building, several of which possessed a feeling for the art a and taste for construction.

In the primitive epoch (1 st and 2 nd centuries A.D.), tradition gives honor to the most famous temples of the Shito f faith; those of Assouta and in the province of Ise, those near Yamada (Temple of Geku) and Toba (Temple of Naiku).

In the 7 th and 8 th centuries Nara, -- capital of the empire from 708 to 782 -- was a great workshop of religious building, whose memory is perpetuated by the Buddhist Monasteries of Horiouji (beginning of the 7 th century), of Todaiji (second quarter of the 8 th century), of Yakuchiji (middle of 8 th century), and of Kouanon (end of 8 th century). To the 7 th century belongs the great Shinto Monastery consecrated to the god Onamuji, at Itzumo near Kizuki.

The demand appears to have been greater still in the 9 th century, increased by the transfer of the seat of the empire to Kioto in 782. It is recalled by the Temples of Kassouga at Nara; of Hatshiman at Kioto, of Obakou at Ouji, and by the Imperial Palace of Gosho at Kioto, etc. From the 11 th century dates the construction of the Temple of the Phoenix at O Ouiji, and of the Shinto Monastery of Ishiyama (1078), rebuilt a century later, and again about the end of the 16 th century. The 13 th century -- the time of the erection of the Temple of Tokoufoudji -- and the 14 th were an epoch of military life, rude and severe manners, excluding luxurious and artistic tastes. But in the 15 th and 16 th centuries, under

the dynasty of Ashikaga, architecture prospered in its peculiar [illegible]

[illegible] of its conservative and [illegible]

temples of Hideyoshi Fukushima (1594) at Zeze, and Nikko at Osaka (1598).

After a [illegible] period (1615-1868), due to the [illegible] and [illegible] in the [illegible] of [illegible]

and [illegible], also copied the forms of [illegible] the Buddhist temples -- the tombs of Ieyasu (1617), a [illegible] at the beginning of the century by Yasumi, the [illegible] of the Tokugawa shoguns, the temporary temples of [illegible] by Yasumi at Nikko, the temples of Hideyoshi at [illegible] and [illegible] but non [illegible] the great temples of Kioto and Osaka, the [illegible] of Nagoya, etc.

II. Natural and Human Conditions. -- Influences. -- Ty-

Japanese [illegible] is both favored and [illegible] by nature: [illegible] is [illegible] with [illegible] [illegible] [illegible]

the dynasty of Ashikaya, architecture prospered in its religious, secular and military forms:-- Palace of Kinkakoudji (beginning of the 15 th century) and that of Ghinkakoudji (middle of 15 th century) at Kioto; Palace of Himkakou, Buddhist Temple of Nishi Hongouandji (1591) at Kioto, and Citadel of Osaka (1582).

After a disturbed period (1580-1601), the 17 th century was an epoch of brilliant civilization and of incessant demands, notably under the reign of Yemitsou (1623-1652), an artistic and building prince, who ecployed the famous architect-sculptor Hidari Zingoro:-- we cite the Castle of Yeddo (Tokio), b built at the beginning of the century by Yeyasu, the first of the Tokugawa Shoguns; the funerary Temple of this prince, erected by Yemitsou at Nikko; the Temple of Tshioin at Kioto; those of Assaksa, Shiba and Ouiyeno at Yeddo (Tokio), the two last now ruined; the great Pagodas of Kioto and Osaka; the C castle of Nagoya, etc.

II. Natural and Human Conditions. -- Influences. -- Epochs.

Japanese architecture is both favored and injured by nature; on the one hand, this is lavish with stone materials and the finest trees in the world, a species of conifers, that raise a straight and rigid trunk to a height of more than 98 ft.; on the other, it refuses to it stability of the ground, earthquakes being in Japan as formidable as frequent.

The climate is characterized by the shortness of winter and by the occurrence of heavy and continuous rains in Bune and July.

Architecture has not obtained from the Japanese an attention equal to that accorded by them to the arts of design and decoration. Their efforts never tended to the invention of n new programmes or to the solution of the problems of construction; they were attached only to perfection of the execution and to the beauty of the ornamentation.

Japan imported from China with Corea as intermediary, nearly all the elements of its architecture, those of the construction as well as those of the plan. For a long time, it was even tributary to Chinese industry for the glazed tiles of i its roofs. [1] But under the influence of special natural cond-

conditions, the possibilities of temperature [illegible] [illegible]-
tion, as well as of a superior aesthetic [illegible], the [illegible]
[illegible]

Note 1. Until the end [illegible] 49 [illegible], [illegible]
[illegible]

Under systems of zone-[illegible] on piles appears to be an ap-
[illegible] [illegible] of [illegible] [illegible].

Finally, one should not be considered that a [illegible] archi-
tecture may have been [illegible] by the [illegible] of [illegible].

There can scarcely be any question of a [illegible] in [illegible]
to [illegible] architecture. The [illegible] [illegible] [illegible] is
based on the [illegible] observations.

[illegible] the 7 on century A. [illegible], a [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [

conditions, the peculiarities of temperament and of civilization, as well as of a superior artistic genius, the Japanese derived from their borrowings a method and effects, which differentiate their productions from their models, generally to their advantage.

Note 1. Until the end of the 16 th century, the time at w which the Koreans introduced into Japan the manufacture of t these tiles.

Their system of construction on piles appears to be an assured indication of Indonesian influences.

Finally, one should not be surprised that a Buddhist architecture may have been impressed by the art of India.

There can scarcely be any question of evolution in regard to Japanese architecture. The distinction between epochs is based on the following observations.

Before the 7 th century A.D., a primitive art produced works with Indonesian affiliations. From the 7 th to the 11 th centuries, it developed in a dependence on China. In the 11 th and still more in the 12 th, it made its advance and attempted innovations. In the 15 th century, it exhibited a fixed system for arrangement as well as decoration, and was master of the processes. In the 16 th century, it inaugurated a passionate seeking for effect in an ultra picturesque key, which in the 16 th century again increased and became excessive. After the 17 th century, it repeated itself.

III. Programmes and their Realizations.

The programme of a Japanese dwelling is extremely simple, but very appropriate to the structural conditions. It essentially foresaw a structure, composed of a roof set on four p posts, to which a floor is attached at about 0.8 ft. above t the ground. The intervals are closed by wooden panels, or by frames covered with paper; both are movable, so that in the daytime and in calm weather, ventilation might be the greatest possible (300; 301).

Light and movable partitions, about 6.6 ft. in height, divide the interior into several cells and a living room, at the rear of which is arranged a recess (tokonoma) adorned by some kakemonos, a vase of flowers and a small table, on which are ornamental articles. Communications are provided by a veranda

the roof (300; 301).

As proper in a country exposed to seismic storms, it is rare for the elevation to comprise several stories. The residence is extended on the ground by the construction of separate [illegible] often as necessary.

Indeed the Japanese do not conceive a house without a garden.[1]

There is scarcely more pretentiousness in the arrangement of a palace, a stable group of pavilions, scattered in a garden, with communications by means of galleries.

The composition of an imperial palace is distinguished in proceeding from the exterior by an entrance between the guard houses, an internal court cordered by offices, a building for [illegible]

Of all the schools of the extreme East, the Japanese is the [illegible] fact, it applied the principle of flanking, combining the system outlined in passage and that of towers. The Castle of [illegible] ry, and is a remarkable specimen of military architecture. (302).[1]

Note 1. Japanese fortification dates from the [illegible] lened by the knowledge of western arms, which the Portuguese [illegible]

The Japanese formula of the Sud [illegible] the dispersed character of the Chinese religious pro-rame; in [illegible] it is a verdant and flowery park, according to the [illegible] (302, 303). The area is surrounded by a wall and is divided by fences into several areas, generally more and more elevated. They are accessible by triumphal gates, frequently with two stories, at the top of flights of steps, to which lead [illegible]

On a [illegible], raised 2.8 to 3.8 ft., is built the sanctuary [illegible]

and a gallery, which frequently forms a balcony attached to the posts of the carpentry and sheltered by the projection of the roof (300; 301).

As proper in a country exposed to seismic shocks, it is rare for the elevation to comprise several stories. The residence is extended on the ground by the construction of separate small houses, connected by covered passages, and repeated as often as necessary.

Indeed the Japanese do not conceive a house without a garden.[1]

Note 1. Concerning the Japanese garden, see page 485.

There is scarcely more pretentiousness in the arrangement of a palace, a simple group of pavilions, scattered in a garden, with communications by means of galleries.

The composition of an imperial palace is distinguished in proceeding from the exterior by an entrance between the guard houses, an internal court bordered by offices, a building for governmental ceremonies, and a private residence.

Of all the schools of the extreme East, the Japanese is the only one, that has elaborated scientific fortifications; in fact, it applied the principle of flanking, combining the system outlined in zigzags and that of towers. The Castle of T Tokio was built by Yegam at the beginning of the 17 th century, and is a remarkable specimen of military architecture. (302).[1]

Note 1. Japanese fortification dates from the decline of the 16 th century; its elaboration was determined and conditioned by the knowledge of western arms, which the Portuguese carried to Japan.

Religious Programmes.

The Japanese formula of the Buddhist temple accents the dispersed character of the Chinese religious programme; in truth, it is a verdant and flowery park, according to the relief, s strown with sanctuaries, monuments and various dependencies. (303, 304). The area is surrounded by a wall and is divided by fences into several areas, generally more and more elevated. They are accessible by triumphal gates, frequently with two stories, at the top of flights of steps, to which lead avenues of trees (298).

On a base, raised 3.8 to 6.6 ft., is built the sanctuary (

[illegible]

[illegible] Tanbo Cove [illegible] : a small structure to consider vanna [illegible] in which [illegible] a [illegible] [illegible] low [illegible] [illegible] [illegible] or [illegible] for the [illegible] etc.

Like that just analyzed, the Sanbo vanna of the Tokiyama [illegible] consists of the choice of a [illegible] and wooden [illegible], the enclosure of a secret area, the separation of [illegible] [illegible] [illegible] [illegible] [illegible] a [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible]

(hondo), the receptacle of a statue of Buddha; it is sometimes divided in three successive halls for different purposes, the first being an oratory, the second an inner vestibule, and t the last is the holy of holies. Here and there rise reliquaries recalling the Indian tope (page 303); a small structure to shelter vowed gifts; pagodas in stories on square plans, surmounted by a pole serving as the axis for nine metal rings (page 303); [1] low campaniles; pavilions covering gongs or basins; great lanterns of bronze; libraries; cloisters; lodgings for the priests etc.

Like that just analyzed, the Shinto variant of the religious programme contemplates the choice of a picturesque and wooded site, the enclosure of a sacred area, the separation of numerous structures and small buildings (305). But it differs in several peculiarities. Before the first entrance, instead of a gate of honor rises a portico (tori)-- in wood or in stone and metal -- on the model of the Indian toran (page 302), composed of two posts with a cross beam raised on the two ends. (299). The composition is more regular than that of the Buddhist temples, more like the conception of Chinese architects; axial and symmetrical, it has several successive concentric square terraces, bordered by galleries enclosing the court. The highest supports the temple (honsha); it is divided in t two parts; a front and accessible one, and a sanctuary, in which is preserved a bronxe mirror, an image of the sun, a sword and the Magatama.

IV. Construction.

The Japanese have never been embarrassed by the construction of masonry of polygonal or rectangular stones; witness certain substructures of buildings and many retaining walls or fortifications, whose surfaces indicate a desire to increase the ability of resistance to earthquakes (302; 306).

In this scourge of Japan must bee seen the primary cause of the decided preference of Nippon architecture for a construction entirely in wood; a second cause consists in the extraordinary abundance of trees. It is entirely proper if the hard materials are employed for the foundations and the substructure.

The latter is very low (300), almost always divided into as

[illegible]

[illegible] carpentry was always singularly skillful, and certain of its practices are very [illegible], such as the construction of a [illegible] tower by means of a great mast serving as an [illegible] (302); such again is the [illegible] method, [illegible]

[illegible]

(307).

What we have said of the construction of the Chinese coverings and roofs is true for the similar Japanese, realized under the influence of China (325; 304; 311) and in competition with a native system of roofing without upward curves (300; [illegible]). We limit ourselves to noting, that being compelled to [illegible]

[illegible] the [illegible] of the tiles, or by replacing them by lapped sheets of [illegible], single or doubled, even by sheets of bark detached from the [illegible] tree (300; 301).

[illegible] Effect.

An [illegible] for effect as its Chinese rival, Japanese architecture long sought it with [illegible] and [illegible], partic- [illegible]

[illegible] a [illegible] and a [illegible] of the [illegible], for example, which [illegible] the [illegible], with which it [illegible] an [illegible] of its [illegible] by an [illegible] placing on a stage of [illegible].

[illegible] of the Chinese with differences in details; for example, such as those resulting from the projection of a porch above a flight of steps, and the construction at the middle of the lower edge of the [illegible] of the roof, [illegible]

[illegible]

many small independent masses as the carpentry structure contains posts. On the whole, the Japanese build on piles.

Japanese carpentry was always singularly skilful, and certain of its practices are very ingenious; such as the construction of a pagoda tower by means of a great mast serving as an axis to a framework (309); such again is the happy method, t that the Japanese derived from the system of successive corbelled brackets, which we mentioned in the preceding Chapter. (308). But no more than the older Chinese were they ever arranged with the triangular panels and the truss with tie-beam. (307).

What we have said of the construction of the Chinese coverings and roofs is true for the similar Japanese, realized under the influence of China (298; 304; 313) and in competition with a native system of roofing without upward curves (300; 301). We limit ourselves to noting, that being compelled to take account of the instability of their soil, the Nippon builders reduced the weight of the covering, either by lessening the thickness of the tiles, or by replacing them by lapped s sheets of copper, single or doubled, even by sheets of bark detached from the hinoki tree (300; 301).

V. Effect.

As careful for effect as its Chinese rival, Japanese architecture long sought it with more discretion and taste, particularly when in the service of the Shinto religion; however in the 17 th century, it sacrificed this to luxury, even to excess.

In the number of its essential characteristics is counted a passion and a sense of the picturesque, for example, which attests the good fortune, with which it always sought an emphasizing of its monumental productions by an adroit placing on a stage of select nature.

On the whole, the forms of Japanese buildings repeat those of the Chinese with differences in details; for example, such as those resulting from the projection of a porch above a flight of steps, and the construction at the middle of the lower edge of the slope of the roof, of a wavy gable, convex at top and recurved at the two ends (298). The school of the 1 17 th century abused the movement of line and relief, even c creating a pretentious and heavy appearance.

from the perfection of the work of its carpenters and the ad-
[illegible] quality of its varnish, lacker, bronze, and native g
[illegible], from a rich polychromy, where vermilion dominates
and in which compete reddish brown, violet, green, yellow and
[illegible]
[illegible] finally, a luxuriant painted and sculptured ornamen-
tation, whose execution is almost always of rare quality, and
[illegible]
images of flowers and birds, with some geometrical motives (
[illegible]). Besides, the interiors are enlivened by pictures
painted on paper and fixed in the panels filling the carpent-
ry frame.

Endowed in the highest degree with feeling for nature, the
Japanese were always as attentive to the composition of the
garden as to the arrangement and decoration of the dwelling
or the temple.

First, after the example of the Chinese [illegible]
[illegible]
dominated by the effect of water, required from nones, basins
and winding streams. Rare plants; dwarf trees and shrubs wi-
th singular shapes; bridges, grottoes, pavilions, little tem-
ples, lanterns in stone or bronze completed the view. Someti-
mes was realized in miniature the image of a celebrated local-
ity ([illegible]).

After the 16 th century was developed a type, whose formula
was fixed in the second half of the 17 th century and was ap-
plied on a great scale in the 17 th. A result of that preci-
[illegible]
ceremonial, it was conceived less for the welfare of the body
and the pleasure of the eyes, than with the aim of exciting
feelings and thoughts. The general outline, the choice, the
arrangement and height of the plants; the adoption and placing
of architectural and decorative motives are regulated by a s
[illegible]
for an exact sense, recalling a being, a fact or a quality.

Nippon architecture derived excellent effects in decoration from the perfection of the work of its carpenters and the admirable quality of its varnish, lacker, bronze, and native g gilding, from a rich polychromy, where vermilion dominates and in which compete reddish brown, violet, green, yellow and gray; metallic overlays and facings; incrustations of mother-of-pearl; finally, a luxuriant painted and sculptured ornamentation, whose execution is almost always of rare quality, and whose dominant themes are the figure of the Chinese dragon, images of flowers and birds, with some geometrical motives ((298; 312). Besides, the interiors are enlivened by pictures painted on paper and fixed in the panels filling the carpentry frame.

Endowed in the heghest degree with feeling for nature, the Japanese were always as attentive to the composition of the garden as to the arrangement and decoration of the dwelling or the temple.

First, after the example of the Chinese (page 354), they l limited themselves to the creation of miniatures of landscapes dominated by the effect of water, required from ponds, basins and winding streams. Rare plants; dwarf trees and shrubs with singular shapes; bridges, grottos, pavilions, little temples, lanterns in stone or bronze completed the view. Sometimes was realized in miniature the image of a celebrated locality (313).

After the 13 th century was developed a type, whose formula was fixed in the second half of the 15 th century and was applied on a great scale in the 17 th. A result of that precious subtlety from which otherwise proceeds the Japanese tea ceremonial, it was conceived less for the welfare of the body and the pleasure of the eyes, than with the aim of exciting feelings and thoughts. The general outline, the choice, the arrangement and height of the plants; the adoption and placing of architectural and decorative motives are regulated by a s symbolism, which attaches to each objectop mode of presentation an exact sense, recalling a being, a fact or a quality.

[illegible] Architectural Styles of America, Oceanica and Africa.

[illegible]

Section I. Architecture of Mexico and Central America.

The civilizations, that flourished in Mexico and central America at the time of the conquest of those countries by the [illegible] the red race; that of the Mayas in Yucatan, in the western part of the isthmus of Tehuantepec, known under the name of the Chiapas country, in Guatemala and in the west part of Honduras; that of the Zapotecs and of the Mixtecs in the eastern region of the isthmus of Tehuantepec, in the vicinity of Oajaca; finally that of the Nahuatl (Aztecs), who dwelt in the basin of Mexico.

I. Requirements. -- Ornamental Chronology and Topography.

[illegible] were [illegible]. The number and importance of the ruins, with which the country is still sprinkled, attest that the causes of the architectural demand were efficient.

The principal evidences are :-- in the north of Yucatan, [illegible] the Nuns", "Temple of the Magician"), of Izmal and Chichenitza -- these being numerous and varied, those of the island of Tozumel, of Tayi etc.' in the isthmus of Tehuantepec, those of Palenque -- which are of the highest interest; in Honduras, those of Copan; in Guatemala, those of Yuxchilan etc.

The architectural works of the Zapotecs, whose quality is remarkable, are known by the vestiges of a city with temples and palace on Mt. Albon, west of Oajaca, and by the original and relatively well preserved edifices of Mitla, east of the same city.

As for the works of the Nahuatl, they are recalled by the remains of a city at Tolian, north of Mexico; by two great temples at San Juan de Teotihuacan, [illegible] northwest of Mexico, by the vestiges on the southeast shore of Lake Texcuco, of Tenochtitlan, the capital of the Aztec kingdom, destroyed

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Part I. Architecture of precolumbian America.

Section I. Architecture of Mexico and Central America.

The civilizations, that flourished in Mexico and central A-America at the time of the conquest of those countries by the Spaniards (1519-1521), were elaborated by those peoples on t the red race; that of the Mayas in Yucatan, in the western part of the isthmus of Tehuantepec, known under the name of the Chiapas country, in Guatemala and in the west part of Honduras; that of the Zapotecs and of the Mistees in the eastern region of the isthmus of Tehuantepec, in the vicinity of Oajaca; finally that of the Nahuatl (aztecs), who dwelt in the basin of Mexico.

I. Requirements. -- Monumental Chronology and Topography.

The energetic race of the Mayas successfully practised agriculture and commerce; their princes were rich, and their pri-
438 ests were powerful. The number and importance of the ruins, with which the country is still sprinkled, attest that the causes of the architectural demand were efficient.

The principal evidences are :-- in the north of Yucatan, the monuments of Uxmal ("Palace of the Governor", "House of the Nuns", "Temple of the Magician"), of Izamal and Chichen-Itzu, -- these being numerous and varied, those of the island of Cozumel, of Zayi etc.; in the isthmus of Tehuantepec, those of Palenque -- which are of the highest interest; in Honduras, those of Copan; in Guatemala, those of Yaxchilan etc.

The architectural works of the Zapotecs, whose quality is remarkable, are known by the vestiges of a city with temples and palace on Mt. Albon, west of Oajaca, and by the original and relatively well preserved edifices of Mitla, east of the same city.

As for the works of the Nahuatl, they are recalled by the remains of a city at Tollan, north of Mexico; by two great t temples at San Juan de Teotihuanacan, 25 miles northwest of Mexico; by the vestiges on the southeast shore of Lake Tezcuco, of Tenochtitlan, the capital of the Aztec kingdom, destroyed

by the Spaniards. Again here the issue of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

The products consist of grives or pottery, [illegible] [illegible] [illegible] [illegible] [illegible]. The purpose of many of these [illegible] in [illegible] [illegible] are to [illegible] of [illegible].

The [illegible] of these as a [illegible] [illegible] is [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

by the Spaniards. Again note the ruins of Huexolla near Tezcuco, Cholula near Puebla, of Xochicalco south of Cuernavaca etc.

The products consist of private or princely habitations; temples and tombs. The purpose of many of these monuments is obscure. There are no traces of fortifications.

The chronology of these architectural styles is indeterminable. It is certain that their youth only preceded by some centuries the arrival of Fernando Cortez, and that they were in full growth, when their career was brutally interrupted by the Spanish conquest.

II. Natural and Human Conditions. -- Influences. -- Schools.

In Yucatan abounds stratified limestone, easily cut, and in large measure entirely quarried by reason of fractures, resulting from the work of water and of plants. The climate is very damp and very hot. The first of these characteristics is even more marked in the region of Palenque, where the rock is likewise limestone, but very hard.

A similar sky, though a little less rainy, extends over the country of the Zapotecs. Toward Oajaca, the ground contains a quartz difficult to work; but in the vicinity of Mitla is found a relatively soft trachyte and also clay, suitable for clay concrete and for making bricks.

From the climatic point of view, the Mexican plateau is more temperate than the provinces previously mentioned. The builder there practically has at command lava and clay.

Note the extreme forest wealth of Central America.

At the time they were crushed by the conquerors, the peoples of Mexican and Central America had attained a relatively high level of civilization, nearly that of Egypt in the time of the first dynasties. They possessed a mode of writing, a annals, and remarkable calendars, they practised successfully the ceramic and textile arts.

Amply provided with labor, thanks to a regime of theocratic absolutism, the architectural styles of Mexico and Central America were injured by the insufficiency of their technical r resources; in fact, they had only rudimentary tools of stone, which in truth, their workmen employed with singular skill.

Their origin and evolution are unknown. Were they aborigines? Did they proceed from the arts of eastern Asia, either that a migration of Asian peoples passed into America across Behring's strait of by the Aleutian islands, or were there direct communications by sea? The second hypothesis, which m may be subbested by certain analogies in appearance between the monuments of Central America and those of Asia; the resemblance of some American beliefs to those of the people of Oceanica; finally, the mention in Indian legends of the civilizing work of a hero, who came from the West, has nothing improbable, considering the direction and regularity of the aerial and marine currents between Asia and America. It is more difficult to admit the supposition, that the artistic development of Central America might have been influenced by an importation of Asian elements, resulting from the extension of the Northmen to the New World.

The analysis of the ruins reveals the coexistence of three schools in Mexico and Central America; the Maya, the Zapotec, and the Nahuatl; the two first being equal and the third inferior. Each comprised a subdivision: the art of Palenque differs from that of Mitla, and that of Teotihuacan from that of Tenochtitlan.

III. Programmes and their Realizations.

Domestic Programmes.

The architectural styles of Mexico and Central America were applied and succeeded in protecting the dwelling, both from the excess of tropical sunshine and from the dampness of a s soil soaked with violent and prolonged rains. They had no o openings other than doorways, which were sometimes sheltered by a vestibule (316, 5), and they were elevated on a high terrace (318, 7,8).

Although they utilized the expedient of columns, as a general rule they subordinated the outline to the necessities of the covering, obtaining the required area by developing the plan in length, which forms one of their characteristics. (316, 5,7).

The habitation was generally composed of four independent structures arranged around a square court, which was consequently open at the angles (316, 5). Indeed the doorway with leaves was unknown; openings were closed by the aid of porti-

[illegible] or [illegible], [illegible] by [illegible], [illegible] the [illegible] of [illegible] the angles of one [illegible] (Lab).

In the region of [illegible] is conveyed [illegible] evolution, [illegible] [illegible] an [illegible] or [illegible] [illegible] an [illegible], [illegible], [illegible] [illegible] the [illegible] of a [illegible] [illegible] [illegible] [illegible] or absorption, [illegible] a [illegible] and [illegible] a [illegible] point, [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] (Lab, 1-2).

[illegible] the [illegible], the [illegible] of [illegible] on [illegible] a [illegible] [illegible], [illegible] [illegible] on a [illegible], [illegible] [illegible] [illegible] [illegible], [illegible] a row of [illegible] [illegible] [illegible] a [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] (Lab, 7).

[illegible] is [illegible] to [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible].

[illegible] [illegible].

In [illegible] and [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

portieres or mats, suspended by cords, for the tension of which there were ingenious arrangements on the surfaces and at the angles of the walls (318).

In the region of Mitla is observed an evolution, which first determined a connected arrangement of the buildings, producing an enclosed court and an entrance, properly so called; then the conception of a homogeneous edifice divided into four apartments, with a vestibule and sometimes a vast porch, extending the entire depth of the facade or even exceeding this (316, 1-3).

Among the Mayas, the system of independent buildings just mentioned, with facades on a court, was in competition with another, where a row of small cells abutted against a rectangular mass, and which comprised an elevation in stories, receding behind each other (316, 7).

The modest tombs consisted of small vaulted chambers. Doubtless it is necessary to behold funerary monuments in severedifices, which pass for temples.

Religious Programmes.

In Mexico and Central America, the temple consisted of a high platform, on the top of which were performed the sacrifices, and which was surmounted by a chapel. The substructure was either formed by a rectangular terrace, by the frustum of a pyramid, with its surfaces smooth or cut in steps, or by a series of terraces receding behind each other (317, 9-14). In Central America, the dimensions never exceeded 495 ft. for the side of the base and 98 ft. for the height; in Mexico, t the great Pyramid of Teotihuacan covered nearly 537,000 sq. ft. and now extends to 176 ft. above the ground.

The sanctuary sometimes consisted of a single cell, entered by one or more doorways, sometimes of a chamber preceded by a vestibule, or sometimes of a row of cells, which extended behind a porch, the middle one containing a holy of holies; (317, 1-8); this was reached by a wide central stairway, or sometimes by four, one on each front (317, 9-14).

IV. Construction.

Materials.

The stone monuments of Yucatan exhibit decorative motives, whose forms preserve the memory of a primitiwe construction

[illegible] of [illegible], and a [illegible] [illegible] of [illegible] [illegible] [illegible]

entirely of wood, and a notable part of that material entered into their construction in the form of isolated supports, lintels, architraves, and of closing panels.

In the Zapotec country and on the Mexican plateau, domestic construction and even monumental largely used earth; at Mitla being mixed with straw and stone spalls; at Mexico with straw or fragments of lava (adobe). These served in the form of c clay concrete or of bricks, which were connected by clay mortar.

Still the use of stone materials was current. Narrowly restricted by insufficient tools, the American styles of architecture had to accommodate themselves to forms, that the texture of the rocks imparted to masses detached from them by fracture, according to whether they had to do with stratified stone or not, they employed rectangular or polygonal masonry, and according to the degree of the hardness of the material, and doubtless also according to the importance of the programme, they resigned themselves to irregularities, or required the leveling or even regularity of the courses, just as they sought vertical joints or not.

In Yucatan, where appeared a soft limestone in natural layers, they freely quarried great blocks [1] and practised perfect cutting, whose merit is measured by the fact, that a certain facade with a mosaic and incrusted surface comprises more than 20,000 blocks of different shapes, joined by mortise and tenon and accurately fitted (315).

Note 1. Without ever exceeding a weight of 7.7 to 8.8 tons.

At Mitla was freely employed the local quartz in great masses weighing as much as 16.5 tons, and the material was prepared with the greatest care. On the Mexican plateau were used lava blocks of irregular sizes and shapes.

The builders in Central America made an enormous use of an excellent mortar containing lime, sand, pebbles and broken stone. They also prepared a waterproof cement of the first quality. Finally, they made great use of stuccos of very remarkable quality.

The Methods.

The Maya school of Palenque practised a solid, but rough c construction, filled with mortar; they also concealed it by stucco.

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On the contrary, the Mayas of Yucatan, and still more the Zapotecs, sought for beauty of the masonry (315; 320).

Among the former, the economical expedient of a mixed construction of concrete between careful facings was the rule. The terraces were constructed of a nucleus of stone spalls connected by clay or mortar, enclosed by a facing of dressed masonry and a platform in cement. The walls, whose foundations e extend to the ground through the substructure, were composed of a filling of small materials joined by mortar and of two faces of beautiful stone masonry. The elements of these were merely jointed on the exterior, but were strongly reduced toward the interior to ensure filling with mortar, which should cause their cohesion (319, 7,8).

The Zapotecs likewise made the middle of their substructure of small stones and clay, or even of crude bricks. But their masonry was homogeneous. On the facade the blocks were jointed as well as possible, the cement only being interposed to correct the defects of imperfect cutting; but the tails were cemented as in the Maya syrtem (320).

In the entire extent of the Mexican and Central American, the construction was extremely massive, doubtless with the a aims of ensuring the edifices against earthquakes and of protecting the interiors from solar heat. At Mitla, the average thickness of the walls is 3.95 ft.; in Yucatan it varies from 3.3 to 9.7 ft.(319, 6,7,8).

Except in Mexico, where they were slightly battering, the external surfaces were vertical.

The openings were covered by lintels of wood or of stone s set on vertical jambs (315; 320; 321), or as the current practice in Yucatan, by an arch produced by corbelling the courses of the wall (319, 4).

The isolated support, which was very much employed, very f frequently consisted of a wooden log. In stone at Mitla, it was monolithic, everywhere else being built; otherwise massive, often being a portion of the wall, rather than a pillar. (320, 321).

Ordinarily, the floor was made of a layer of cement 3/4 to 2 ins. thick and surprisingly hard; more rarely, it was of stone slabs.

[illegible] of [illegible], [illegible] are [illegible] by [illegible] of [illegible] in the [illegible] of regular [illegible] varying [illegible] [illegible] the [illegible] in [illegible] by [illegible], [illegible].

[illegible] [illegible]. They [illegible] [illegible] (p. 7). [illegible] [illegible] a [illegible] ([illegible]; [illegible], [illegible], [illegible]).

V. Sites.

[illegible] [illegible] [illegible] of [illegible] and [illegible] [illegible] [illegible] [illegible] for [illegible] of [illegible] [illegible] [illegible] [illegible] of [illegible] [illegible] [illegible] of [illegible].

They can be [illegible], and in [illegible] [illegible] [illegible] of the [illegible] [illegible] [illegible] of [illegible] [illegible] [illegible] [illegible]

447 Among the Zapotecs and the Nahuatl, the covering was a ceiling of wood or of stone, which was supported by columns if n necessary (319, 6). The Mayas preferred the vault, that they realized in the form of Angular tunnel vaults erected by corbelling the courses and closed by slabs (319, 7,8).

Excepting at Palenque, where to facilitate the discharge of the very abundant rains, they gave it a slope (319, 7), the roof was a terrace (315; 319, 6,8; 320).

V. Effect.

The architectural styles of Mexico and Central America passionately sought for effect by all means at the command of t the art of building.

They had the taste, and in large measure the sense of the picturesque arrangement of monumental form. That came from their method of elevating sanctuaries on pedestals, furnished with grand stairways (317), from arranging buildings for a palace in stories on the steps of a terrace (316, 7), or from placing them on platforms dominating a great court and modeling them in steps on their front surfaces (316, 5). As typical examples of exteriors may be cited the ruins of Palenque with their great terraces, arranged in stories from the banks of a river to the platforms supporting the temples; and also those of Mt. Alban near Oajaca, which recommends the great o operation of grading an entire canton, with the aim of composing a theatrical and magnificent group of islands, promontories and of hills crowned by edifices. Characteristic likewise are the great double or triple openings (320; 321) and the high crestings with which the Mayas finished the roofs (319, 6,8).

The secondary reliefs of the monuments of Central America are more developed, than one would expect from architectural styles without tools of iron.

Thus the facades were limited at top by the projection of the cornices (315; 319, 8), which sometimes projected very f far in the region of Palenque (319, 7). The walls were accented by embryo mouldings; cut according to the economical profile of a tablet with vertical or beveled edge, sometimes following the outline of a half square separated by two right-a angled triangles with their most acute vertexes opposed, the

[illegible] often [illegible] scene and [illegible] a [illegible] forming [illegible] (fig. 6,7,9; [illegible]).

[illegible] the [illegible] of [illegible] cylindrical [illegible] [illegible], frequently, set [illegible] after the fashion of one piece of a [illegible] (fig. [illegible]). [illegible] a very original [illegible]

[illegible] or [illegible] [illegible] to [illegible] from the [illegible] [illegible] surfaces and edges of the [illegible] of doors in form of [illegible] or of [illegible] or [illegible] [illegible], which one might say [illegible] carved in wood ([illegible], [illegible]).

The effect of reliefs of [illegible] was only negligeable.

[illegible] price of [illegible] [illegible], [illegible] very [illegible] ([illegible], [illegible] [illegible], [illegible]). At [illegible], it was a [illegible] or [illegible], [illegible] from [illegible] [illegible] [illegible], and [illegible] was [illegible] by a [illegible] [illegible] [illegible] a [illegible] ([illegible], [illegible]). In [illegible], [illegible] [illegible] were [illegible], for [illegible], that of a [illegible] [illegible] with [illegible] [illegible] a [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] of a [illegible], the [illegible] at [illegible] [illegible] [illegible] or the [illegible] ([illegible], [illegible]).

[illegible] in the [illegible] of [illegible] [illegible], [illegible] from [illegible] [illegible], [illegible] [illegible] the [illegible] of the [illegible] [illegible] [illegible] [illegible].

[illegible] [illegible] [illegible] of [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [

mouldings were often repeated above and below a field forming a band (315; 319, 6,7,8; 321).

Movement was again produced by sinkings or perforations ((320); as also by the relief of half columns, cylindrical or turned like balusters, frequently set close after the fashion of the posts of a palisade (321, 4). Add a very original effect of projections, resulting from the mode taken by the architects of Central America to project from the face plane t the surfaces and edges of the angles of bosses in form of blocks or of rising or falling crockets, which one might say w were carved in wood (321, 4).

The effect of reliefs of details was only neglected.

The ordinary form of the isolated support was that of a rectangular prism or of a cylinder, both very stumpy (329, 6; 3 321, 4). At Mitla, it was a sort of cube, whose front face was quite battering, and above was enhanced by a rectangular tablet enclosing a niche (320);321, 3). In Yucatan, fanciful forms were loved; for example, that of a kneeling man with back against a post, and particularly the singularly decorative one of a serpent, the head at bottom and resting on the ground (321, 2).

449 Likewise in the image of that reptile, extending from top to bottom, were fashioned the parapets of the stairways leading to the terraces.

The architectural styles of Mexico and Central America freely sacrificed to ornamentation.

Among the Mayas of the region of Palenque and among the Nahuatl, a coating of stucco was the rule. The former applied it over the entire internal and external surfaces of the edifice, including the roof.

All the schools lavished sculptures, which were sometimes confined to the field of a high frieze (315), sometimes extended over the entire facade, even as among the Zapotecs, over the entire monument (320). In regard to quality, the palm belongs to the Maya decorators of Palenque.

450 The insufficient tools forbad to these architectural styles the effects of high relief. They made up by those of engraving or sinking and by that of a marquetry of inlaid stones. The Mayas of Palenque limited themselves to a modeling or sc-

sculpture of their layers of stucco, which was realized with rare mastery.

Still as much, and perhaps more even the taste for sculptured ornamentation, the architectural styles of Mexico and Central America had a passion for polychromatic effects.

Those realized by them are recommended more by the esthetic merit of a warm and contrasted harmony than by the extraordinary quality of the material. The palette of the Zapotecs c comprised almost exclusively white and red; more varied, that of the Mayas was charged with white, black, blue, yellow and red.

The repertory was limited among the Zapotecs to a geometrical ornamentation, which in truth was surprisingly varied; it particularly consisted of the chessboard, frets and other motives offered by woven and embroidered fabrics (320). Among the Mayas, the geometrical ornamentation was in competition with images of men and animals in awkward and rude drawing, and with grotesque or monstrous figures; both were chiefly s symbolical.

[illegible]

Tuesday.

In the ocean region [illegible] the western coast of [illegible] may be distinguished two [illegible] of land, separate [illegible] and have a quantitative [illegible] by the coast, [illegible] Arctic problem; in the [illegible] point [illegible] [illegible] at the expense of [illegible] [illegible] of the 19th century (.).

2. Geologic [illegible] — Man [illegible] Economy and [illegible]

Between 5° and 15° [illegible] latitude, along — nearly [illegible] of a city as [illegible] from [illegible] and of a Tropic [illegible] Ocean — shows the [illegible] activity of the [illegible] and [illegible] region of the [illegible], [illegible] [illegible] are shown by the [illegible], [illegible] and [illegible] [illegible] [illegible].

[illegible] are [illegible] by the [illegible], [illegible] [illegible], [illegible] [illegible] Andes are the [illegible] in the region of [illegible], and [illegible] [illegible] [illegible]

Section II. Architectural Styles of Andean A America.

In the Andean region and on the western coast of South America may be distinguished two strata of civilizations; on the one hand a primitive group formed by the Chimu, Chincha and Aymara peoples; on the other being that of the Quichuas, developed at the expense of the preceding after the beginning of the 11 th century A.D.

I. Requirements. -- monumental Chronology and Topography.

1. Works of Chimu, Chincha and Aymara Civilizations.

Between 3° and 12° south latitude, ruins -- notably those of a city at Chanchan near Trujillo and of a Temple at Mojeque near Casma -- attest the artistic activity of the powerful a and industrious nation of the Chimur, whose remarkable abilities are shown by its ceramic, textile and metallurgical productions.

Before being subjected by the Quichuas, like the Chimus, t the Chinchas were established between the Andes and the Pacific in the region of Lima, and thus north and south of that city built cities and sanctuaries, whose remains have been found in great numbers in the basins of the Rimac, particularly at Huatica (Huadca) and at Cajamarquilla; of the Lirin, r ruins of Pachamaq; of the Canete, ruins of Hervay; of the Chincha, ruins of the Tombo de Mora etc.

On the elevated Andean plateau and in the vallies between the Cordilleras -- on the one side even to the upper course of the Maranon; on the other as far as Chili -- were peoples, which must doubtless be identified with the ancestors of the existing Aymaras, who left significant and sometimes impressive evidences of skilful practice of the art of building. As examples may be cited in the region of the upper Santa and t the upper Maranon a Palace and a Temple at Chavin de Huantar; a fortress at Huanachuco; and particularly at Tiahuanaco, at the southeast extremity of Lake Titicaca, a group of considerable ruins, evidence of a great undertaking, that was interrupted by the conquest of the country by the Quichuas.

2. Works of the Quichuas.

The Quichua people had its origin in the elevated Andean l lands between 14° and 15° south latitude, and between the Ap-

Apurimac and the eastern Cordilleras with Cuzco as its centre. At the beginning of the 11 th century A.D., under the lead of Manco Capac, founder of the dynasty of the Incas, commenced a brilliant fortune, which attained its climax at the beginning of the 16 th century, the time at which it dominated Andean America from 2° 30′ north latitude to 35° 20′ south latitude. But its career was destroyed by the success of the expedition of F. Pizarro, completed in 1535.

Quichua civilization was propitious to the development of an architectural style. A regime of an enlightened despotism and of state communism produced a considerable demand for works for the government or of public utility -- palaces, barracks, imperial caravanserais, aqueducts, canals and granaries, the ruling of vast territories inhabited by hostile and energetic nations, required good roads [1] and numerous fortresses. By reason of its character, both official and national, the religion offered to the art of building many occasions for e exerting itself in realizing temples, dwellings for priests and convents for nuns. [2] The sovereigns, imperial princes and nobility required palaces. Finally, the beliefs relating to the dead created the need of tombs.

Note 1. A road was established on the elevated lands to c connect Cuzco at one end, Quito and Chili at the other ! Another led from Cuzco to Quito along the coast, which it reached at the mouth of the Chincho and left at Tugbez (frontier of Peru and Equador.

Note 2. The Quichuas worshipped an immaterial and eternal deity, manifested under the forms of the sun, moon, morning star, thunder and the rainbow. The dynasty of the Incas passed for natives of the sun.

The first evidences of the architectural productions of the Quichuas, in the epoch of the Incas, are divided in two groups.

The first comprises the ruins located at the heart of the empire in the region of Cuzco. The grandeur of that city, b both the political capital and a holy city, is recalled by t the remains of the famous Temple of the Sun -- termed Inti-huari or Coricancha (Golden House) -- erected by Manco Capac a and beautified by the Inca Yupanqui, his ninth successor; by the strong Citadel of Sacsahuaman; finally by numerous porti-

[illegible]

[illegible]

[illegible]

portions of palaces and houses, recognizable in the edifices of the modern city. At Pisac in the valley of the Huillcanota may be seen palaces; at Ollantai-Tambo, a little north of Cuzco, remain the vestiges of a city and a great fortress; at Huilcas-huaman, a strong strategic position northwest of the capital, exist palaces, forts parracks, great storehouses, a well preserved temple and a convent for nuns.

A second series may be formed of Quichua constructions in conquered countries; on the high plateau in an island of Lake Titicaca, regarded as a sacred place, are the ruins of a sanctuary and of various monastic and lay buildings; in the elevated valley of the Huallaga, a branch of the Maranon, at Huanaco-Vieja are very important remains, in whose number is one of the most carefully built and best preserved Temples of the entire empire; in the coast region at Moche, south of Trujillo is a Temple of the Sun; a fortress at Chancaillo near Casma; a Temple at Pachacamaq and a fort and Palace at Hervay.

II. Natural and Human Conditions. -- Influences. -- Sc Schools and Epochs.

The natural conditions for the development of an architectural style in Andean America appeared differently, according as there is considered the valley of the Cordilleras and the elevated plateaus, or the basins of the tributaries of the P Pacific. In the first case is the abundance of stones, limestone, red sandstone, especially trachyte, basalt, granite a and porphyry, with the harshness of a dry climate having violent contrasts of heat and cold; in the second is the limitation of the structural material to clay, and the regime of h hot dampness of equatorial and tropical countries. A common character is the frequency and violence of earthquakes.

Similarly, and perhaps even more than those of Mexico and Central America, the architectural styles of Andean America had at command unlimited labor. They again resemble each other in that their tools were rudimentary, substantially composed of stone instruments, and of copper to a small extent. The surprising results represented in certain works and the astonishing perfection in execution assume a remarkable orgaization of labor and marvellous technical skill. [1]

Note 1. The Andean peoples, particularly the Chimus and Q

Quichuas, practised with great success the arts of metal-working, ceramics and fabrics. Certain specimens of their abilities are of the first order.

We are ignorant of the origin and evolution of Andean architecture. The opinion, that they are derived from those of M Mexico and Central America is not acceptable. The hypothesis of an Asian affiliation is not absurd, for it is not exceptional for junks to be driven by trade winds and the currents of the Pacafic on the coast of Equador and Peru; only there was no proper communication, merely an accidental and individual influence.

It is certain, that the extraordinary technical quality of the ruins of Tihuanaco and the impossiblity of conceiving the development of a civilization in the climatic and agricultural conditions of the high Andean plateaus require the placing of the beginnings of Aymara architecture in a very distant p part and in more favorable countries.

The examination of the monuments of the Andean America reveals three different styles. A first one is confined to the coast region; two others are peculiar to elevated lands, one preceding the career of the Quichuas, the other being their work. The latter advanced in three stages,and it attained its full maturity, when the empire of the Incas fell under t the attacks of the conquerors.

III. Programmes and their Realizations.

Public and City Works. -- Fortifications.

Their public works ensure to the Quichuas of the epoch of the Incas a place of honor in the history of civilization beside the Romans.

They realized systems of scientific irrigation, comprising great reservoirs, canals in concreted masonry, and finally t the traversing of obstacles by tunnels and valleys by means of aqueducts.

Their great roads, whose duration to our own times shows t their excellence, in the opinion of A. de Humboldt, are "comparable to the finest Roman roads". With a width of 16.4 ft. and macadamized, they pass over streams by suspension bridges and valleys on embankments; they cling to slopes by the expedient of retaining walls, and at need, by a cut into the rock.

The plan of Cuzco reveals the purpose of the arrangement of a city; it distributes 13 quarters about acentral square bordered by the Imperial Palace, the Temple of the Sun, the Convent of the Vestals and the Mansions of the Princes.

One of the most brilliant manifestations of the architectural genius of the Quichuas is their system of fortification. They combined in a masterly way the multiplication, the successive stories and the flanking of the enclosures, furnished w-with strong walls 16.4 to 19.7 ft. high, several receding and concentric terraces, ensuring the defense of the foot of the walls by the expedient of zigzag outlines or of bastions (324,1; 324, 5). They compensated for their ignorance of the gate with leaves by the adroit applications of the artifice of a tricy entrance, susceptible of being closed by a barricade 324, 2-4).

458 Domestic and Funerary Programmes.

In its elementary form, the Quichua house was reduced to a cabin (325, 5); it was composed of a rectangular enclosure, to whose internal walls were attached several square chambers, isolated from each other and opening on a central court (325, 3). The windows were often wanting (325, 2), as suitable under a torrid sky, or were rare and always small. Recesses in the walls served for closets. Doors were unknown, openings being closed only by portieres or mats.

The palace was merely a house designed on a great scale. Erected for the sovereign, it consisted of a great enclosure, that the long blocks of buildings, set perpendicularly to the axis passing through the entrance, divided into several courts, the last being reserved for the private residence. In e each were arranged groups of rooms around a rectangular space. Almost always, the elevation comprised but one story (325, 1).

The Chimu palaces of Chinchan present analagous arraogements, differentiated by the doubled enclosing wall and by a more confused arrangement.

In the territory corresponding to Bolivia and south from Peru, [1] the tomb was in the form of a tower (chulpa)(326); Elsewhere it was a cavern excavated in the side of a hill, an excavation in the rock, or even a pit.

Note 1. See the Acropolis of Sillustani.

Religious Programmes.

Chimu, Chincha, Aymara or Quichua, the programme of a temple of Andean America essentially required a great base in the form of a stepped pyramid with a stairway at the middle of t the front side. In the upper country, the terraces were concentric; on the coast, they receded behind each other from t the front of the monument. The Aymara Temple of Chavin de H Huantar is distinguished by the existence of a chapel, designed as a labyrinth, in the mass of its substructure. The top 459 platform bore the sanctuary, and in the absence of actual examples of this, pottery images afford us an idea. In the Chimu and Chincha country, the upper part was formed of small pyramids (327).

IV. Construction.

Earth was the ordinary material of Chimu and Chincha construction. Mixed with bits of reeds, it was generally and directly in the state of tamped earth; for careful building it was shaped in moulds, that it left in the form of rectangular blocks sometimes measuring as much as31.5 × 13.4 × 6.7 ins. The walls were prudently built battering on both faces.

In the upper country, construction was in stone.

The Aymaras practised two methods; a pile of small stones 460 connected by mortar -- of which the fortress of Huanachuco offers an example; a megalithic construction, as exhibited by the ruins of Tihuanaco.

The dimensions of the latter are given by a certain block of red sandstone 25.3 ft. long, 15.0 ft. high and 4.9 ft. thick, and by the monolithic gateway of Ak-kapanu, whose dimensions are 12.8, about 6.9 and 1.15 ft.(323). Yet the most characteristic trait of the technics of the example presented by Tihuanaco is the marvellous cutting; so much the more admirable because the forms are often very complicated, the material is extremely hard, and that the workmen had not even bronze tools. A competent traveler has affirmed, "that in no other part of the world had he seen stones cut with such math- 461 ematical accuracy as in Peru, and that in no other part of P Peru could anything surpass those scattered in the plain of Tihuanaco".[1]

Note 1. Spier. See the drawings of Stübel.(Die Ruinenstätte von Tihuanacoo

No more than the Aymaras, did the Quichuas fear to quarry and handle masses; witness a certain stone, brought from afar and raised on a hill for the construction of the Citadel of Sacsahuaman, that measures 19.0 × 9.7 × 7.5 ft. ! And they likewise excelled in adjusting the masonry, as we have just noted. In truth, they commenced with a rudimentary construction. But while accepting the rounded shape of blocks produced by the accidents of quarrying, they required an accurate jointing, whatever the weight and the irregularity of the elements (328). Finally, they realized regular masonry and rectangular blocks, that count in the first rank of masterpieces of the kind; so perfect, that actually the thinnest blade cannot be introduced into the joints (329). Yet if the stones are set dry next the outside, they are separated in the interior by a thin layer of mortar.

Like the Aymaras, the Quichuas thought to resist the effects of seismic shocks by the artifice of indented masonry. Thus sometimes a cavity was made in the top of a stone to receive a projection of the same size left in dressing the lower surface of the block set upon it.

A characteristic peculiarity of Quichua construction, and which also distinguishes it from its elder Aymara, Chimu and Chincha relatives, is the very prominently trapezoidal form imposed on all openings (325, 2; 329).

Even monumental Andean architecture crowned its edefices by a roof in carpentry or a covering of thatch (325, 4,5; 330). Yet the funerary towers of Sillustani exhibit a stone covering produced by corbelling the courses (326).

V. Effect.

The various artistic productions of Andean peoples attest their passion for effect.

Chimu architecture loved the accenting of a surface spotted by indents, distributed to create an ornamental appearance. It especially employed with remarkable success ornamental or significant frescos.

Aymara architecture sought the effect of secondary relief and sculpture in the measure permitted by its insufficient tools: thus it treated the architraves of openings with reveals and ears, recessed niches with accented profiles in the

surfaces of the walls and carved friezes (328).

As for the Quichuas, they contented themselves with the effect of relief by the appearance of bosses resulting from their method of giving the faces of the stones a convex shape. (329). Singular in ornamentation, they required particularly overlays of massive gold, even on the exterior. Thus on the Temple of the Sun at Cuzco, the sanctuary of the god was entirely covered with gold, and the upper zone of the walls of the entire edifice gleamed with the splendor of the same metal, a finger in thickness and wide as a hand, and a frieze 18 inches in height.

ica and of Africa.

Chapter 1. Architecture in Oceanica.

Numerous monuments are recognized from the Carolina to Easter Islands and from Hawaii to New Zealand, attesting the ar- [illegible] Polynesian peoples. These exist in the island of Malden, in [illegible] Pitcairn island, that Europeans found deserted, were found i important substructures, at Tapa were fortifications; paved ponds on Hunnaine, in Christmas island, streets paved with o blocks of coral; in Easter island, tombs open to the sky or subterranean; in New Zealand were curiously carved works of carpentry; in the island of Tinian, one of the Marianne, re- [illegible]

The ruins of Tinian and of Ponape merit special mention.

The former consist of groups of piers on the tops of which were placed the floors of houses conserved after the formula of the dwelling on piles, placed in two rows 9.7 to 14.1 ft. apart, these supports consisted of a rectangular and strongly diminished shaft, whose sides measured about 4.4 ft. at the base, and of a hemispherical cap with a diameter of 5.2 ft. [illegible]

The creators of Nanmatal were skilful engineers. Taking a advantage of the existence of a basaltic plateau at the shore, on which the depth of water did not exceed one foot at low t tide, or three to four at high tide, they realized a marine city covering no less than 104 acres (Bas, 1). On the eastern side, it is protected against the swell by a sort of embankment and by an angular breakwater, pierced on the protected side by an opening for the passage of canoes. The city was composed of artificial islands measuring 66 to 427 ft. on a side and separated by canals 26.5 to 26[illegible] ft. wide. Some of these terraces bore dwellings; not some had a funerary purpose; such as Nan Tavatsen, that rises to 6.5 ft. above the [illegible], a terrace [illegible] ft. long and 1[illegible] ft. wide, on the surface [illegible]

Part II. Native Architectural Styles of Oceanica and of Africa.

Chapter 1. Architecture in Oceanica.

Numerous monuments are recognized from the Caroline to Easter Islands and from Hawaii to New Zealand, attesting the architectural aptitudes and activities of the Micronesian and Polynesian peoples. These exist in the island of Malden, in the Marquesas, in Tahiti, Mangarewa and Tongatabou etc. In Pitcairn island, that Europeans found deserted, were found i important substructures, at Rapa were fortifications; paved roads on Huaheine, in Christmas island, streets paved with b blocks of coral; in Easter island, tombs open to the sky or subterranean; in New Zealand were curiously carved works of carpentry; in the island of Tinian, one of the Mariannes, remains of the dwellings of the Chamorros, the ancient inhabitants of the country; at Panope (Ascension island), the dead city of Nanmatal, an Oceanican Venice, etc.

The ruins of Tinian and of Panope merit special mention.

The former consist of groups of piers on the tops of which were placed the floors of houses conceived after the formula of the dwelling on piles, placed in two rows 9.7 to 13.1 ft. apart, these supports consisted of a rectangular and strongly diminished shaft, whose sides measured about 4.6 ft. at the base, and of a hemispherical cap with a diameter of 8.2 ft. They are built of stones joined by mortar of coral lime(333,4).

The creators of Nanmatal were skilful engineers. Taking a advantage of the existence of a basaltic plateau at the shore, on which the depth of water did not exceed one foot at low t tide, or three to four at high tide, they realized a marine city covering no less than 104 acres (333, 1). On the eastern side, it is protected against the swell by a sort of embankment and by an angular breakwater, pierced on the protected side by an opening for the passage of canoes. The city was composed of artificial islands measuring 66 to 427 ft. on a side and separated by canals 29.6 to 230 ft. wide. Most of these terraces bore dwellings; but some had a funerary purpose; such as Nan Tauatsch, that rises to 6.6 ft. above the sea, a terrace 230 ft. long and 197 ft. wide, on the surface of which were two rectangular and concentric enclosures, the

external one being 29.6 ft. high and the internal 13.1 ft. The construction of these massive terraces is composite; a f facing is made of piles of transverse basalt shafts with a filling of coral, supporting a nucleus of blocks and paved w with basalt (333, 3).

Oceanican monuments date from an epoch in which the population was more dense than now, pacified by powerful sovereigns and disciplined by a patriarchal regime, being capable of undertakings and compelled to united efforts. As for the origin and the evolution of the art revealed by them, these remain enigmatical.

Chapter 2. Native Architecture in Africa.

To the historian of the art of building with mineral elements, Africa supplies no material, except in the Sahara, the Soudan, and in Rhodesia. Also the first and second of these regions, north of the 10 th parallel of latitude, form a part of the area of Mohammedan art. We shall limit our examination to the southernSoudan, where the architecture appears to be properly African, and to Rhodesia.

I. Architecture in southern Soudan.

In the Mandingo country, otherwise termed the upper basin of the tributaries of the gulf of Guinea between the Fonte-Djallon and the Volta, the house is in two stories; the lower one is half buried in the ground and forms a platform, on which is erected a habitation with a verandah (335, 3). From the Volta to the Niger, the dwelling is fortified, at the angles rise towers or turrets; generally, the external wall rises above the roof and is furnished with battlements (335,4). Still farther east prevails a type of small fort on a rectangular plan, above which rise the ventilating flues of the habitation (335, 6).

Everywhere the construction is of earth; the covering is r realized by means of a wooden ceiling beneath a terrace or a covering of thatch, conical or with slopes. The walls are battering.

II. Architecture in Rhodesia.

Monumental Chronology and Topography.

Between the Zambesi and the Limpopo in modern Rhodesia, the memory of the famous empire of Monomotapa is preserved by two groups of ruins. In Mashonaland, southeast of Salisbury, there remain:-- at Umtali and Inyanga, dwellings and forts; at the place called Niekerk ruins, a group of fortifications extending over more than 58 square miles. In Matabeleland, near and east of Buluwayo, may be seen at Khami, Dhlo-Dhlo, Nanatali and Zimbabwe, houses, military works and strong castles; that of Nanatali is distinguished by the quality of its construction, that of Zimbabwe -- that can be identified with the residence of the sovereign of Monomotapa, [1] mentioned by Portuguese descriptions of the 16 th century -- by the imposing grandeur of its remains, which cover an area of more than

[illegible]

[illegible] Ants and wasps of Africana; with the most undoubted -- [illegible] of associational -- no not appear to possess the [illegible] [illegible]; [illegible], [illegible] of [illegible] [illegible] [illegible]

48,500 sq. ft. In these monuments, some have desired to see evidences of a colonization of the auriferous country by the legendary inhabitants of Ophir, even by the subjects of the Queen of Sheba, famous through the Bible. The truth is, that they were the work of Africans; that the most ancient -- those of Mashonaland -- do not appear to precede the 14 th century A.D.; finally, that those of Matabeleland date from the 15 th to 16 th centuries, the epoch of the prosperity of the port of Sofala, which was one of the great markets of Arab commerce. [2] It is noted, that their builders were industrious, and had iron tools at command.

Note 1. This ruin is improperly called the "Elliptical Temple".

Note 2. See the conclusive demonstration by Randall Mac I Iver in Mediaeval Rhodesia.

The demands appear to have been exclusively in the domestic and military categories; the second appears to have been determined by the necessity of protecting themselves from a danger threatening them on the north.

Programmes and their Realizations.

In Mashonaland, more exposed to danger, the conception of the habitation was dominated by care for its defense. The h house was placed on the slope of a hill and near its summit, in the centre of successive concentric enclosures in stories, about 6.6 ft. high, whose outline was that of an ellipse (337,1), as far as permitted by the site, sometimes to the number of fifty. A built terrace compensated for the inclination of the ground, and supported the dwelling and outbuildings; in its mass was reserved a room for security, accessible by a narrow corridor.

In Matabeleland, the house was entirely on the ground, raised on a substructure. A princely castle was composed of an elliptical enclosure, surrounded by a wall sometimes with a thickness exceeding 13.1 ft.; at the centre was a terrace, a also an ellipse, and crowned by a wall, forming a keep, and supporting at about 6.6 ft. above the ground the dwelling of the master, a circular cabin surrounded by cells. Radiating walls separated the sectors; platforms served as bases for t the habitations of the faithful (337, 2,3). In brief, it is

the realization in stone, of the kraal of a chief in modern southern Africa.

It is apparently correct to attribute a religious purpose to two conical towers, [3] which rise in the southern part of the Castle of Zimbabwe.

Note 3. The larger one measures 56 ft. in circumference.

Construction.

The masonry is very solid. Its materials are natural split blocks of granite, of average dimensions and approximately r rectangular shape. The masonry is almost regular, thanks to a wise selection of the elements, to rough dressing, and particularly to a careful arrangement (337, 5).

Jointing with mortar is rather rare. Yet the use of a cement, into the composition of which entered fragments of granite, was common for the establishment of an artificial site; for building the wall of a cabin, and finally for strengthening at different heights the masonry of terraces, which was further aided by the insertion of beams in their mass.(337,3).

Effect.

A search for effect is manifested by the arrangements in j jointing, producing the appearance of gables, ropes, herringbone and chessboard forms, and also by the insertion of courses of serpentine in the elevations of granite monuments. (337, 4,5).

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